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# **Radiation Protection Program for Design and Construction**

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## Acronyms

ALARA	as low as reasonably achievable
CFR	Code of Federal Regulations
DAC	derived air concentration
DOE	US Department of Energy
ES&H	Environmental, Safety, and Health
GERT	General Employee Radiological Training
HNF	Hanford
NRC	US Nuclear Regulatory Commission
PPE	Personal Protection Equipment
RCT	Radiological Control Technician
RPP	Radiation Protection Program
SI	Scientific International
TFRM	Tank Farms Radiological Control Manual
TLD	thermoluminescent dosimeter
RPP-WTP	River Protection Project – Waste Treatment Plant

## 1. Introduction

This document is the Radiation Protection Program (RPP) for design and construction activities for the River Protection Project – Waste Treatment Plant (RPP-WTP) project located at the US Department of Energy (DOE) Hanford Site. As used in this document, the RPP is the radiation protection program document for achieving compliance with the requirements of Title 10 Code of Federal Regulations (CFR) 835, “Occupational Radiation Protection”. Pursuant to 10 CFR 835.101(g)(2), a revision to the RPP must be submitted to DOE before commencement of the WTP construction activities.

The RPP is developed and submitted for regulatory approval in stages corresponding to the status of the RPP-WTP project. This RPP submittal, while retaining the plans and measures implemented previously during the design phase, includes plans and measures for achieving compliance with the requirements of 10 CFR 835 that are applicable to the RPP-WTP construction phase. An additional revision will be required prior to commencement of operations.

## 2. RPP Document Organization

The RPP provides a description of the plans and measures for achieving compliance with the requirements of 10 CFR 835. Descriptions within this document may include references to DOE Implementation Guides or other industry standards. Where applicable, mandatory or optional use will be noted for each reference cited for guidance.<sup>1</sup>

A matrix of each 10 CFR 835 requirement and the plans and measures for achieving compliance with that specific requirement is contained in Appendix A, WTP Compliance with 10 CFR 835 Requirements (Design and Construction Phase). The matrix includes plans and measures described in the Tank Farms Radiological Control Manual (TFRCM) and/or various RPP-WTP programs, as appropriate.

## 3. Purpose

The purpose of this RPP is to describe the plans and measures for achieving compliance with 10 CFR 835 requirements. Nothing in this RPP, the TFRCM, and/or in any implementing document shall be construed as limiting actions that may be necessary to protect health and safety.

## 4. Applicability

This RPP is applicable to facility design and construction activities. Construction activities include final determination of all facility design features and complete construction of all facilities and associated services in accordance with design specifications.

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<sup>1</sup> Compliance with US Department of Energy Implementation Guides is not mandatory. Acknowledging their use or other guidance documents, as noted in the Bibliography, in the preparation of this RPP does not make compliance with these guides, or other referenced documents, enforceable.

Construction activities (limited construction and construction authorization activities are collectively referred to as “construction” activities throughout this document) performed by CHG or its subcontractors include:

- site preparation work
- site excavation work
- structure construction and fabrication
- site radiological monitoring
- posting and control of radiological areas
- cleanup and disposal of detected radioactive materials
- facility testing and evaluation up to the point where the WTP receives radioactive feed materials

All RPP-WTP activities shall be conducted in compliance with a documented RPP as approved by the DOE. CHG shall not initiate any task outside the scope of this RPP until an update of the RPP is approved by DOE.

## **5. Graded Approach**

### **5.1. Discussion**

The 10 CFR 835 consists primarily of highly prescriptive worker safety requirements that establish the radiation protection standards, limits, and program requirements for protecting individuals from ionizing radiation resulting from the conduct of DOE activities. These very specific requirements are not subject to a graded approach. However, the rule also contains eight requirements that are “performance-based” (that is, specify an end result without prescribing what is necessary to achieve the desired results), and ten others that require a terminology clarification in order to clearly establish the intent and scope of the requirement.

For the purpose of this RPP, a graded approach is achieved either through the inclusion of clarifying terminology, or through the incorporation of narrative text which describes those CHG commitments considered appropriate to meet performance-based requirements. These additions are incorporated into Appendix A.

### **5.2. Summary of Requirements Subject to a Graded Approach**

Requirements determined to be suitable for a graded approach through a performance-based approach, (Table 1) or through the use of clarifying definitions, (Table 2) are listed in the following tables.

### 5.2.1. Graded Approach (8 Total)

The following table includes those non-prescriptive, performance-based requirements that are subject to a graded approach through the incorporation of additional provisions including narrative text, references to controlling technical bases and program documents, or other technical standards deemed sufficient to establish the commitment bases mandated by the requirements. Appendix A (WTP Project Compliance with 10 CFR 835 Requirements) contains a listing of these provisions. The graded approach is based on considerations of the magnitude of the hazard, the complexity of the situation, and the length of time the situation will exist.

**Table 1. Requirements Subject to a Graded Approach**

Requirement Number	10 CFR 835 Section	Discussion
21	103	CHG will apply the graded approach in the implementation of CHG Radiation Protection Program procedures for this functional area.
22	104	CHG will apply the graded approach in the implementation of CHG Radiation Protection Program procedures for this functional area.
43	401(a)	The requirements of Section 835.401 are subject to the graded approach through criteria established by CHG's monitoring program. The program establishes administrative records for tracking and trending radiological conditions based on routine tasks (radiation survey reports). Task descriptions and work documents specify the frequency of radiological surveys. Workplace air sampling program defines criteria for use of continuous air monitors.
101-103	901(c)	CHG will apply the graded approach in the implementation of CHG Radiation Protection Program procedures for this functional area. Note the application of section 901(c) graded approach is also referenced in requirements 101 through 103.
105	901(e)	CHG will apply the graded approach in the implementation of CHG Radiation Protection Program procedures for this functional area.
117	1102(a)	Establishment of "appropriate controls" to prevent inadvertent transfer of removable radioactive contamination to locations outside radiological areas under normal operating conditions is subject to a graded approach that balances the relevant factors such as environmental and biological vectors. CHG will maintain a contamination control program to monitor and control radioactive contamination. <sup>2</sup>

### 5.2.2. Terminology Clarifications (10 Total)

Those requirements determined to be suitable for a graded approach through the incorporation of terminology clarifications include the following. Appendix A (WTP Project Compliance with 10 CFR 835 Requirements) contains these clarifications as an integral part of establishing CHG's commitment basis.

<sup>2</sup>Letter, J D Wagoner, RL, to Dr. A L Trego, WHC, REQUEST FOR EXEMPTION OF DOE NUCLEAR SAFETY RULE 10 CFR 835.404(b), dated August 23, 1995. [Note: Referenced in HNF-SP-1145, Rev 2 and maintained for historical reference. 1998 amended rule moved requirement from 10 CFR 835.404(b) to 10 CFR 835.1102(b).]

**Table 2. Requirements Subject to Terminology Clarifications**

<b>Requirement Number</b>	<b>10 CFR 835 Section</b>	<b>Terminology Clarification</b>
13	101(c)	“Commensurate with the nature of the activities performed” is the nature of those activities, described in Section 4.0, that are performed by CHG, its subcontractors, and suppliers at CHG-managed facilities and activities.
18	101(h)	“Changes that decrease the effectiveness of the RPP” are those changes which, if implemented, may result in unnecessary increases in occupational exposure or loss of control of radioactive materials without a corresponding increase in the scope or effectiveness of radiological work activities performed. CHG will apply the guidelines of DOE G 441.1-1, Section 4, paragraph 3, March 1999, when making this determination.
37	206(b)	CHG will apply the guidance of DOE G 441.1-6, “Evaluation and Control of Radiation Dose to the Embryo/Fetus Guide” of 29 April 1999, Section 4.2 guideline statement to maintain declared pregnant worker fetus dose below 50 mrem per month.
45	402(a)(1) to (4)	“Are likely to receive” recognizes that professional judgment and experience will be used in making decisions in specific circumstances. [DOE G 441.1-1, Section 4., paragraph 5, March 1999.]
47	402(c)(1) to (4)	Workers who “are likely to receive” recognizes that professional judgment and experience will be used in making decisions in specific circumstances. [DOEG 441.1-1, Section 4., paragraph 5, March 1999.]
49	403(a)(1)	“An individual is likely to receive” recognizes that professional judgment and experience will be used in making decisions in specific circumstances. [DOEG 441.1-1, Section 4, paragraph 5, March 1999.]
82	702(e)	“Reasonable efforts shall be made” means at least 3 attempts to obtain exposure information as recommended by Occupational Protection Record-Keeping and Reporting Guide, DOE G 441.1-11, Section 4.1.1.4 of May 1999.
91	704(b)	“Actions taken to maintain...” means the seven essential elements of an occupational ALARA program, as specified in the Implementation Guide, “Occupational ALARA Program Guide”, DOE G 441.1-2, Rev 1, March 17, 1999.
132	1302(a)	“Risk...shall be minimized” means, if alternative actions are available to meet emergency needs, then adopting the action with the lowest assessed risk of significant personnel injury shall take precedence over property loss considerations.
136	1304(a)	“Installations possessing sufficient quantities of fissile material to potentially constitute a critical mass” means as identified in the facility specific authorization document based on DOE 5480.23 dated 10 March 1994.



## 6. Requirements Matrix

The matrix contained in Appendix A specifically addresses all requirements and provisions contained in 10 CFR Part 835. Each Rule requirement is restated verbatim in the matrix, and is accompanied by sufficiently detailed information to establish CHG's commitment basis for that requirement.

The specific measures, identified to achieve compliance, are selected to be commensurate with CHG activities. In some instances, the top-level controlling document references are supplemented by narrative text and/or clarifying definitions. The combination of references and supplemental text contained in this matrix defines CHG's commitment basis to DOE. The matrix column titled "other implementing provisions" includes clarifications, supplemental policy statements, references to Technical Basis Documents, and any other supplemental information used to clearly define CHG's commitment basis. For those requirements where programmatic commitments are listed, the committed aspects of the identified program are limited to those elements essential to ensuring compliance with the regulatory requirement.

Nothing in this matrix is intended to deviate from the intent of 10 CFR 835. Where inconsistencies exist between the TFRCM and 10 CFR 835, the specific Articles listed are intended to demonstrate policy consistent with the intent of the Rule.

The word "shall" when followed by [835.XXX] identifies those elements that are directly attributable to a requirement from 10 CFR 835. These requirements are mandatory and will be followed as written. The word "shall" when followed by [XXXXXX] identifies those elements that are a requirement from another federal or state regulation, DOE Order, or other requirements document as indicated by the reference in the bracket. The word "shall" when followed by [HNF] identifies those elements and requirements that have been agreed to by the CHG and DOE-ORP as necessary for consistency in the implementation of radiological controls. Compliance with these requirements is mandatory unless an exemption is obtained from DOE and/or the appropriate regulatory agency in accordance with TFRCM Article 113.

Where the word "should" appears in referenced TFRCM Articles, for the purpose of this RPP, this means the contractor has the responsibility either to implement the cited provision exactly, or demonstrate the technical equivalency of an alternative approach in accordance with the provisions of TFRCM Article 113. Each referenced TFRCM article containing a "should" statement will be implemented as written, or the CHG Radiological Control Program will have prepared and implemented an alternative approach, consistent with TFRCM Article 113 and 10 CFR 835 Section 101(h).

Where the verbiage of a referenced TFRCM Article is either modified or excerpted in order to more clearly capture the specific intent of the Rule requirement, such modification or excerpting is noted in parentheses in the matrix.

## 7. Bibliography

(Recognition of these resources in the development of the WTP RPP does not make them part of the RPP, or make them enforceable, unless already so.)

- 10 CFR 20, "Standards for Protection Against Radiation", *Code of Federal Regulations*, as amended.
- 10 CFR 820, "Procedural Rules for DOE Nuclear Activities", *Code of Federal Regulations*, as amended.
- 10 CFR 835, "Occupational Radiation Protection", *Code of Federal Regulations*, as amended.
- DOE, 1999, *Management and Administration of Radiation Protection Programs Guide*, Implementation Guide G 441.1-1, US Department of Energy, Washington, D.C.
- DOE, 1999, *Occupational ALARA Program Guide*, Implementation Guide G 441.1-2, US Department of Energy, Washington, D.C.
- DOE, 1999, *Internal Dosimetry Program Guide*, Implementation Guide G 441.1-3, US Department of Energy, Washington, D.C.
- DOE, 1999, *Evaluation and control of Radiation Dose to the Embryo/Fetus Guide*, Implementation Guide G 441.1-6, US Department of Energy, Washington, D.C.
- DOE, 1999, *Occupational Radiation Protection Record-Keeping and Reporting Guide*, Implementation Guide G 441.1-11, US Department of Energy, Washington, D.C.
- DOE, 1998, *TWRS Phase I Privatization Site Preconstruction Characterization Report*, HNF-2067, Revision 0, Richland, Washington.
- ICRP, 1989, *Optimization and Decision-Making in Radiological Protection*, ICRP Publication 55, Ann. ICRP 20 No. 1.
- ICRP, 1990, *Recommendations of the International Commission on Radiation Protection*, ICRP Publication 60 Ann. ICRP 21 Nos. 1-3.
- Munson, L.H., 1988, *Health Physics Manual of Good Practices for Reducing Radiation Exposure to Levels that are As Low As Reasonably Achievable (ALARA)*, PNL-6577, Pacific Northwest Laboratory, Richland, Washington.
- NRC, 1976, *Information Relevant to Ensuring that Occupational Radiation Exposures at Nuclear Power Stations will be As Low As Is Reasonably Achievable*, Regulatory Guide 8.8, Rev 3, US Nuclear Regulatory Commission, Washington, D.C.

A

## **Appendix A**

### **WTP Project Compliance with 10 CFR 835 Requirements**

**(Design and Construction Phase)**

Requirement #      10 CFR 835 Citation	Policy and Commitment Basis	
	Tank Farms Radiological Control Manual, HNF-5183, Rev0	Other Implementing Provisions
<b>Subpart A            General Provisions</b>		
<b>1</b> Sec. 835.1(a)  General. The rules in this part establish radiation protection standards, limits, and program requirements for protecting individuals from ionizing radiation resulting from the conduct of DOE activities.		DOE Administrative. This is a provision not a requirement.
<b>2</b> Sec. 835.1(b)  Exclusion. Except as discussed in paragraph (c) of this section, the requirements in this part do not apply to: <ol style="list-style-type: none"> <li>(1) Activities that are regulated through a license by the Nuclear Regulatory Commission or a State under an Agreement with the Nuclear Regulatory Commission, including activities certified by the Nuclear Regulatory Commission under Section 1701 of the Atomic Energy Act;</li> <li>(2) Activities conducted under the authority of the Director, Naval Nuclear Propulsion Program, as described in Pub. L. 98-525;</li> <li>(3) Activities conducted under the Nuclear Explosives and Weapons Surety Program relating to the prevention of accidental or unauthorized nuclear detonations;</li> <li>(4) Radioactive material transportation as defined in this part;</li> <li>(5) DOE activities conducted outside the United States on territory under the jurisdiction of a foreign government to the extent governed by occupational radiation protection requirements agreed to between the United States and the cognizant government; or</li> <li>(6) Background radiation, radiation doses received as a patient for the purposes of medical diagnosis or therapy, or radiation doses received from participation as a subject in medical research programs.</li> </ol>	<b>Article 112.2 (excerpt and modified)</b>  “Except as discussed in this Article, these requirements do not apply to: <ol style="list-style-type: none"> <li>a. Activities that are regulated through a license by the Nuclear Regulatory Commission or a State under an Agreement with the Nuclear Regulatory Commission, including activities certified by the Nuclear Regulatory Commission under section 1701 of the Atomic Energy Act.”</li> <li>b. Activities conducted under the authority of the Director, Naval Nuclear Propulsion Program as described in Public Law 98-525.”</li> <li>c. Activities conducted under the Nuclear Explosives and Weapons Surety Program relating to the prevention of accidental or unauthorized nuclear detonations.”</li> <li>d. Radioactive material transportation as defined in the glossary of this manual.”</li> <li>e. DOE activities conducted outside the United States on territory under the jurisdiction of a foreign government to the extent governed by occupational radiation protection requirements agreed to between the United States and the cognizant government; or”</li> <li>f. Background radiation, radiation doses received as a patient for the purposes of medical diagnosis or therapy, or radiation doses received from participation as a subject in medical research programs.”</li> </ol>	CHG accepts the exclusions of § 835.1(b) as written.

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Requirement #      10 CFR 835 Citation	Policy and Commitment Basis	
	Tank Farms Radiological Control Manual, HNF-5183, Rev0	Other Implementing Provisions
<b>3</b> Sec. 835.1(c)  Occupational doses received as a result of excluded activities and radioactive material transportation, as listed in paragraphs (b)(1) through (b)(5) of this section, shall be considered when determining compliance with the occupational dose limits at §§ 835.202 and 835.207, and with the limits for the embryo/fetus at § 835.206. Occupational doses resulting from authorized emergency exposures and planned special exposures shall not be considered when determining compliance with the dose limits at §§ 835.202 and 835.207.	Article 213.1 ( <b>excerpt and modified</b> )  “All occupational doses received during the current year, except doses resulting from planned special exposures conducted in compliance with Article 213.3 and emergency exposures authorized in accordance with Article 213.4, shall [835.202(b)] be included when demonstrating compliance with Table 2-1, occupational dose limits for general employees and minors.  Occupational doses received as a result of excluded activities and radioactive material transportation, as listed in Article 112.2 (a-e), shall [835.1(c)] be considered when determining compliance with the occupational dose limits in Table 2-1 and Article 215.”	
<b>4</b> Sec. 835.2  Definitions.		CHG accepts the definitions of section § 835.2 as written. The definitions in this section shall be used in documents and programs that implement requirements of 10 CFR 835, where the definition is used in the text of this rule.
<b>5</b> Sec. 835.3(a) General rule.  No person or DOE personnel shall take or cause to be taken any action inconsistent with the requirements of:  (1) This part; or  (2) Any program, plan, schedule, or other process established by this part.	Article 113.1 ( <b>excerpt</b> )  “No person or DOE personnel shall take or cause to be taken an action inconsistent with the requirements of:  (1) 10 CFR 835; or  (2) Any program, plan, schedule, or other process established by 10 CFR 835.”	
<b>6</b> Sec. 835.3(b)  With respect to a particular DOE activity, contractor management shall be responsible for compliance with the requirements of this part.	Article 113.1 ( <b>excerpt</b> )  “With respect to a particular DOE activity, contractor management shall [HNF] be responsible for compliance with the requirements of [10 CFR 835].”	
<b>7</b> Sec. 835.3(c)  Where there is no contractor for a DOE activity, DOE shall ensure implementation of and compliance with the requirements of this part.		This is a provision applicable to DOE. The scope of this Radiation Protection Program is limited to contractor activities. (See Section 4, applicability).

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Requirement #	10 CFR 835 Citation	Policy and Commitment Basis	
		Tank Farms Radiological Control Manual, HNF-5183, Rev0	Other Implementing Provisions
<b>8</b>	Sec. 835.3(d)  Nothing in this part shall be construed as limiting actions that may be necessary to protect health and safety.	Article 113.1 ( <b>excerpt and modified</b> )  “Nothing in the TFRCM shall [835.3(d)] be construed as limiting actions that may be necessary to protect health and safety.”	
<b>9</b>	Sec. 835.3(e)  For those activities that are required by §§ 835.102, 835.901(e), 835.1202(a), and 835.1202(b), the time interval to conduct these activities may be extended by a period not to exceed 30 days to accommodate scheduling needs.	Article 113.1 ( <b>excerpt</b> )  “For those activities that are required by Articles 134, 431, and 613, the time interval to conduct these activities may be extended by a period not to exceed 30 days to accommodate scheduling needs.”	
<b>10</b>	Sec. 835.4 Radiological units  Unless otherwise specified, the quantities used in the records required by this part shall be clearly indicated in special units of curie, rad, roentgen, or rem, including multiples and subdivisions of these units. The Scientific International (SI) units, Becquerel (Bq), gray (Gy), and sievert (Sv), are only provided parenthetically in this part for reference with scientific standards.	Article 713.1.f ( <b>excerpt and modified</b> )  “Unless otherwise specified, the quantities used in the radiological control records required by this RPP shall [835.4] be clearly indicated in special units of curie, rad, roentgen, or rem, including multiples and subdivisions of these units. The SI units, becquerel (Bq), gray (Gy), and sievert (Sv), are only provided parenthetically in this part for reference with scientific standards.	
<b>Subpart B Management and Administrative Requirements</b>			
<b>11</b>	Sec. 835.101(a)  Radiation protection programs  A DOE activity shall be conducted in compliance with a documented RPP as approved by the DOE.		Upon DOE approval, this RPP establishes the documentation to implement § 835.101(a) as written.  The RPP will be managed and controlled through the establishment of appropriate administrative measures through the WTP document control system.
<b>12</b>	Sec. 835.101(b)  The DOE may direct or make modifications to a RPP.		This is a provision and not a requirement. CHG accepts provision § 835.101(b) as written.
<b>13</b>	Sec. 835.101(c)  The content of each RPP shall be commensurate with the nature of the activities performed and shall include formal plans and measures for applying the as low as reasonably achievable (ALARA) process to occupational exposure.		CHG’s approved RPP establishes the documentation to implement § 835.101(c) as written. The RPP will be managed and controlled through the establishment of appropriate administrative measures through the CHG document control system.

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Requirement #      10 CFR 835 Citation	Policy and Commitment Basis	
	Tank Farms Radiological Control Manual, HNF-5183, Rev0	Other Implementing Provisions
		<p>“Commensurate with the nature of the activities performed” is the nature of those activities performed by CHG, its subcontractors, and suppliers at CHG-managed facilities and activities.</p> <p>This requirement is implemented through PL-W375-NS00005, <i>RPP-WTP ALARA Program</i>, which addresses the seven essential elements of ALARA programs.</p> <p>Part of ALARA Implementation Guide, “Occupational ALARA Program Guide,” DOE G 441.1-2 of 17 March 1999 includes seven essential elements of ALARA Program – Policy and Management Commitment; ALARA Training; Plans, and Procedures; Internal Assessments/Audits; ALARA Design Review; Radiological Work/Experiment Administration and Planning; and Records.</p>
<p><b>14</b>                      Sec. 835.101(d)</p> <p>The RPP shall specify the existing and/or anticipated operational tasks that are intended to be within the scope of the RPP. Except as provided in Sec. 835.101(h), any task outside the scope of a RPP shall not be initiated until an update of the RPP is approved by DOE.</p>		<p>See Applicability section of Radiation Protection Program, (Section 4). The RPP will be managed and controlled through the WTP document control system.</p> <p>If any radiological activities are determined to be outside the RPP scope (as defined in Section 4), except as provided in § 835.101(h), CHG shall obtain DOE approval of a revised RPP. The RPP will be managed and controlled through the WTP document control system.</p>

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	Tank Farms Radiological Control Manual, HNF-5183, Rev0	Other Implementing Provisions
<b>15</b> Sec. 835.101(e)  The content of the RPP shall address, but shall not necessarily be limited to, each requirement in this part.		Upon DOE approval, this RPP implements § 835.101(e) as written. The RPP will be managed and controlled through the WTP document control system.
<b>16</b> Sec. 835.101(f)  The RPP shall include plans, schedules, and other measures for achieving compliance with regulations of this part. Unless otherwise specified in this part, compliance with amendments to this part shall be achieved no later than 180 days following approval of the revised RPP by DOE. Compliance with the requirements of § 835.402(d) for radiobioassay program accreditation shall be achieved no later than January 1, 2002.		This matrix provides WTP plans and measures for achieving compliance with the requirements of 10 CFR 835. Following approval by DOE, this RPP will be implemented within 180 days or prior to start of WTP construction activities, whichever occurs earlier.
<b>17</b> Sec. 835.101(g)  An update of the RPP shall be submitted to DOE:  (1) Whenever a change or an addition to the RPP is made;  (2) Prior to the initiation of a task not within the scope of the RPP; or  (3) Within 180 days of the effective date of any modifications to this part.		CHG accepts requirement § 835.101(g)(1) as written. The RPP will be managed and controlled through the establishment of appropriate administrative measures through the WTP document control system.
<b>18</b> Sec. 835.101 (h)  Changes, additions, or updates to the RPP may become effective without prior Department approval only if the changes do not decrease the effectiveness of the RPP and the RPP, as changed, continues to meet the requirements of this part.  Proposed changes that decrease the effectiveness of the RPP shall not be implemented without submittal to and approval by the Department.		CHG accepts the requirement as written.  “Changes that decrease the effectiveness of the RPP” are those changes which, if implemented, may result in unnecessary increases in occupational exposure or loss of control of radioactive materials without a corresponding increase in the scope or effectiveness of radiological work activities performed. CHG will apply the guidelines of DOE G 441.1-1, Section 4, paragraph 3, March 1999, when making this determination.



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Requirement #     10 CFR 835 Citation	Policy and Commitment Basis	
	Tank Farms Radiological Control Manual, HNF-5183, Rev0	Other Implementing Provisions
		The RPP will be managed and controlled through the establishment of appropriate administrative measures through the WTP document control system.
<b>19</b> Sec. 835.101(i)  An initial RPP or an update shall be considered approved 180 days after its submission unless rejected by DOE at an earlier date.		CHG accepts requirement § 835.101(i) as written. The RPP will be managed and controlled through the establishment of appropriate administrative measures through the WTP document control system.
<b>20</b> Sec. 835.102  Internal audits  Internal audits of the radiation protection program, including examination of program content and implementation, shall be conducted through a process that ensures that all functional elements are reviewed no less frequently than every 36 months.	Article 134.1 ( <b>excerpt</b> )  “Internal audits of the Radiological Protection Program including examination of program content and implementation, shall [835.102] be conducted through a process that ensures that all functional elements are reviewed no less frequently than every 36 months.”	
<b>20</b> Sec. 835.102  Internal audits  Internal audits of the radiation protection program, including examination of program content and implementation, shall be conducted through a process that ensures that all functional elements are reviewed no less frequently than every 36 months.	Article 134.1 ( <b>excerpt</b> )  “Internal audits of the Radiological Protection Program including examination of program content and implementation, shall [835.102] be conducted through a process that ensures that all functional elements are reviewed no less frequently than every 36 months.”	The WTP Radiological Safety Manager is responsible for ensuring audits of all functional elements of the radiation protection program are conducted no less frequently than every 36 months.
<b>21</b> Sec. 835.103  Education, training, and skills  Individuals responsible for developing and implementing measures necessary for ensuring compliance with the requirements of this part shall have the appropriate education, training, and skills to discharge these responsibilities.	Article 142.2  “The Radiological Control Manager shall [HNF] have the technical competence and experience to establish radiological control programs and the supervisory capability to direct the implementation and maintenance of radiological control programs.”  Article 611 ( <b>excerpt &amp; modified</b> )  “Individuals responsible for developing and implementing measures necessary for ensuring compliance with the requirements of [10 CFR 835] shall [835.103] have the appropriate education, training, and skills to discharge these responsibilities.”	

Requirement #      10 CFR 835 Citation	Policy and Commitment Basis	
	Tank Farms Radiological Control Manual, HNF-5183, Rev0	Other Implementing Provisions
<b>22</b> Sec. 835.104  Written procedures  Written procedures shall be developed and implemented as necessary to ensure compliance with this part, commensurate with the radiological hazards created by the activity and consistent with the education, training, and skills of the individuals exposed to those hazards.	Article 125.11 ( <b>excerpt and modified</b> )  “Written procedures shall [835.104] be developed and implemented as necessary to ensure compliance with 10 CFR 835, commensurate with the radiological hazards created by the activity and consistent with the education, training, and skills of the individuals exposed to those hazards.”	CHG shall develop and implement procedures according to the requirements established in the procedure and document control procedures.
<b>Subpart C                      Standards for Internal and External Exposure</b>		
<b>23</b> Sec. 835.202(a)  Occupational dose limits for general employees.  Except for planned special exposures conducted consistent with § 835.204 and emergency exposures authorized in accordance with § 835.1302, the occupational dose received by general employees shall be controlled such that the following limits are not exceeded in a year:  (1) A total effective dose equivalent of 5 rems (0.05 sievert); (2) The sum of the deep dose equivalent for external exposures and the committed dose equivalent to any organ or tissue other than the lens of the eye of 50 rems (0.5 sievert); (3) A lens of the eye dose equivalent of 15 rems (0.15 sievert); and (4) A shallow dose equivalent of 50 rems (0.5 sievert) to the skin or to any extremity.	Article 213.1 ( <b>excerpt</b> )  “Occupational dose limits are provided in Table 2-1 and shall [835.202(a)] not be exceeded. Except for planned special exposures conducted consistent with Article 213.3 and emergency exposures authorized in accordance with Article 213.4, the occupational dose received by general employees shall [835.202(a)] be controlled such that the limits in Table 2-1 are not exceeded in a year.”	CHG implements the requirements of section § 835.202 through the CHG dosimetry program and through subcontracted services.
<b>24</b> Sec. 835.202(b)  All occupational doses received during the current year, except doses resulting from planned special exposures conducted in compliance with § 835.204 and emergency exposures authorized in accordance with § 835.1302, shall be included when demonstrating compliance with §§ 835.202(a) and 835.207.	Article 213.1 ( <b>excerpt</b> )  “‘All Occupational doses received during the current year, except doses resulting from planned special exposures conducted in compliance Article 213.3 and emergency exposures authorized in accordance with Article 213.4 shall [835.202(b)] be included when demonstrating compliance with Table 2-1, occupational dose limits for general employees and minors.”  Table 2-1 ( <b>excerpt</b> ) “Summary of Dose Limits”  Table 2-1 Note 1 ( <b>excerpt</b> )	

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	“Determinations of the effective dose equivalent shall [835.203(b)] be made using the weighting factor values provided in Appendix 2B.”	
<b>25</b> Sec. 835.202(c)  Doses from background, therapeutic and diagnostic medical radiation, and participation as a subject in medical research programs shall not be included in dose records or in the assessment of compliance with the occupational dose limits.	Table 2-1 ( <b>excerpt</b> )  Summary of Dose Limits  Table 2-1 Note 3 ( <b>excerpt</b> )  “Doses from background, therapeutic and diagnostic medical radiation, and participation as a subject in medical research programs shall [835.202(c)] not be included in dose records or in the assessment of compliance with the occupational dose limits.”	
<b>26</b> Sec. 835.203(a)  Combining internal and external dose equivalents  The total effective dose equivalent during a year shall be determined by summing the effective dose equivalent from external exposures and the committed effective dose equivalent from intakes during the year.	Table 2-1 Note 1 ( <b>excerpt</b> )  “Internal dose to the whole body shall [835.203(a)] be calculated as committed effective dose equivalent. The committed effective dose equivalent is the resulting dose committed to the whole body from internally deposited radionuclides over a 50-year period after intake.”  Table 2-1 Note 5  “The total effective dose equivalent during a year shall [835.203(a)] be determined by summing the effective dose equivalent from external exposures and the committed effective dose equivalent from intakes during the year.”  TFRCM Glossary ( <b>excerpt</b> ):  Whole body dose: “The sum of the annual deep dose equivalent for external exposures and the committed effective dose equivalent for internal exposures”.  Total effective dose equivalent: “means the sum of the effective dose equivalent (for external exposures) and the committed effective dose equivalent (for internal exposures)”.  Deep dose equivalent: “means the dose equivalent derived from external radiation at a depth of 1 cm in tissue”.	CHG implements the requirements of section § 835.203 through the CHG dosimetry program, and through subcontracted services.

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<b>27</b> Sec. 835.203(b)  Determinations of the effective dose equivalent shall be made using the weighting factor values provided in Sec. 835.2.	Table 2-1 Note 1 ( <b>excerpt</b> )  “Determinations of the effective dose equivalent shall [835.203(b)] be made using the weighting factor values provided in Appendix 2B.  Appendix 2B ( <b>excerpt</b> )  Weighting Factors for Organs and Tissues	
<b>28</b> Sec. 835.204(a)  Planned special exposures.  A planned special exposure may be authorized for a radiological worker to receive doses in addition to and accounted for separately from the doses received under the limits specified in Sec. 835.202(a), provided that each of the following conditions is satisfied:  (1) The planned special exposure is considered only in an exceptional situation when alternatives that might prevent a radiological worker from exceeding the limit in Sec. 835.202(a) are unavailable or impractical;  (2) The contractor management (and employer, if the employer is not the contractor) specifically requests the planned special exposure, in writing; and  (3) Joint written approval is received from the appropriate DOE Headquarters program office and the Secretarial Officer responsible for environment, safety, and health matters.	Article 213.3 ( <b>excerpt</b> )  “A planned special exposure may be authorized for a radiological worker to receive doses in addition to and accounted for separately from the doses received under the limits for general employees specified in Table 2-1, provided that each of the following conditions is satisfied:  - The planned special exposure is considered only in an exceptional situation when alternatives that might prevent a radiological worker from exceeding the limits in Table 2-1 are unavailable or impractical;”  Article 722.12  “Authorized emergency exposures and planned special exposures shall [835.1301(b)] be accounted for separately, but maintained with the individual’s occupational exposure records.”  Article 213.3.a ( <b>excerpt</b> )  “The contractor management (and employer, if the employer is not the contractor) specifically requests the planned special exposure, in writing.”  Article 213.3.a ( <b>excerpt</b> )  “Joint written approval is received from the appropriate DOE Headquarters program office and the Secretarial Officer responsible for environment, safety and health matters.”	CHG does not anticipate any planned special exposures occurring. Should circumstances occur where a planned special exposure would be required the requirements of § 835.204 will be followed.

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<b>29</b> Sec. 835.204(b)  Prior to requesting an individual to participate in an authorized planned special exposure, the individual's dose from all previous planned special exposures and all doses in excess of the occupational dose limits shall be determined.	Article 213.3.b  "Prior to requesting an individual to participate in an authorized planned special exposure, the individual's dose from all previous planned special exposures and all doses in excess of the occupational dose limits shall [835.204(b)] be determined."	CHG does not anticipate any planned special exposures occurring. Should circumstances occur where a planned special exposure would be required the requirements of § 835.204 will be followed.
<b>30</b> Sec. 835.204(c)  An individual shall not receive a planned special exposure that, in addition to the doses determined in Sec. 835.204(b), would result in a dose exceeding the following: <ol style="list-style-type: none"> <li>1. In a year, the numerical values of the dose limits established at § 835.202(a); and</li> <li>2. Over the individual's lifetime, five times the numerical values of the dose limits established at § 835.202(a).</li> </ol>	Article 213.3.c  "An individual shall [835.204(c)] not receive a planned special exposure that, in addition to the doses determined in Article 213.3.b, would result in a dose exceeding the following: <ol style="list-style-type: none"> <li>- In a year, the numerical values of the dose limits established at Table 2-1 for general employees; and"</li> <li>- "Over the individual's lifetime, five times the numerical values of the dose limits established at Table 2-1 for general employees."</li> </ol>	CHG does not anticipate any planned special exposures occurring. Should circumstances occur where a planned special exposure would be required the requirements of § 835.204 will be followed.
<b>31</b> Sec. 835.204(d)  Prior to a planned special exposure, written consent shall be obtained from each individual involved. Each such written consent shall include: <ol style="list-style-type: none"> <li>(1) The purpose of the planned operations and procedures to be used;</li> <li>(2) The estimated doses and associated potential risks and specific radiological conditions and other hazards which might be involved in performing the task; and</li> <li>(3) Instructions on the measures to be taken to keep the dose ALARA considering other risks that may be present</li> </ol>	Article 213.3.d ( <b>excerpt</b> )  "Prior to a planned special exposure, written consent shall [835.204(d)] be obtained from each individual involved. Each written consent shall [835.204(d)] include: <ol style="list-style-type: none"> <li>– "The purpose of the planned operations and procedures to be used;"</li> <li>– "The estimated doses and associated potential risks and specific radiological conditions and other hazards which might be involved in performing the task".</li> <li>– "Instructions on the measures to be taken to keep the dose ALARA considering other risks that may be present".</li> </ol>	CHG does not anticipate any planned special exposures occurring. Should circumstances occur where a planned special exposure would be required the requirements of § 835.204 will be followed.
<b>32</b> Sec. 835.204(e)  Records of the conduct of a planned special exposure shall be maintained and a written report submitted within 30 days after the planned special exposure to the approving organizations identified in Sec. 835.204(a)(3).	Article 213.3.e  "Records of the conduct of a planned special exposure shall [835.204(e)] be maintained and a written report submitted within 30 days after the planned special exposure to the approving organizations identified in Article 213.3(a)."	CHG does not anticipate any planned special exposures occurring. Should circumstances occur where a planned special exposure would be required the requirements of § 835.204 will be followed.

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<b>33</b> Sec. 835.204(f)  The dose from planned special exposures is not to be considered in controlling future occupational dose of the individual under Sec. 835.202(a), but is to be included in records and reports required under this part.	Article 213.3.f ( <b>excerpt and modified</b> )  “The dose from planned special exposures is not to be considered in controlling future occupational dose of the individual under Table 2-1, but is to be included in records and reports required by 10 CFR 835.”  Article 722.12  “Authorized emergency exposures and planned special exposures shall [835.1301(b)] be accounted for separately, but maintained with the individual’s occupational exposure records.”	CHG does not anticipate any planned special exposures occurring. Should circumstances occur where a planned special exposure would be required the requirements of § 835.204 will be followed.
<b>34</b> Sec. 835.205(a)  Determination of compliance for non-uniform exposure of the skin.  Non-uniform exposures of the skin from X-rays, beta radiation, and/or radioactive material on the skin are to be assessed as specified in this section.	Table 2-1 Note 4  “Non-uniform exposures of the skin from X-rays, beta radiation, and/or radioactive material on the skin shall [835.205] be assessed as specified in Appendix 2C.”	This requirement is implemented though the CHG dosimetry program and through subcontract with providers that comply with this requirement.
<b>35</b> Sec. 835.205(b)  For purposes of demonstrating compliance with Sec. 835.202(a)(4), assessments shall be conducted as follows:  (1) <i>Area of skin irradiated is 100 cm<sup>2</sup> or more.</i> The non-uniform dose equivalent received during the year shall be averaged over the 100 cm <sup>2</sup> of the skin receiving the maximum dose, added to any uniform dose equivalent also received by the skin, and recorded as the shallow dose equivalent to any extremity or skin for the year.  (2) <i>Area of skin irradiated is 10 cm<sup>2</sup> or more, but is less than 100 cm<sup>2</sup>.</i> The non-uniform dose equivalent (H) to the irradiated area received during the year shall be added to any uniform dose equivalent also received by the skin and recorded as the shallow dose equivalent to any extremity or skin for the year. H is the dose equivalent averaged over the 1 cm <sup>2</sup> of skin receiving the maximum absorbed dose, D, reduced by the fraction f, which is the irradiated area in cm <sup>2</sup> divided by 100 cm <sup>2</sup> (i.e., H=fD). In no case shall a value of f less than 0.1 be used.  (3) <i>Area of skin irradiated is less than 10 cm<sup>2</sup>.</i> The non-uniform dose equivalent shall be averaged over the 1 cm <sup>2</sup> of skin	Appendix 2C ( <b>excerpt</b> )  – “Area of skin irradiated $\geq$ 100 cm <sup>2</sup> – The non-uniform dose equivalent received during the year shall [835.205(b)(1)] be averaged over the 100 cm <sup>2</sup> of the skin receiving the maximum dose, added to any uniform dose equivalent also received by the skin, and recorded as the shallow dose equivalent to any extremity or skin for the year.”  – “Area of skin irradiated $\geq$ 10 cm <sup>2</sup> and < 100 cm <sup>2</sup> – The non-uniform dose equivalent (H) to the irradiated area received during the year shall [835.205(b)(2)] be added to any uniform dose equivalent also received by the skin and recorded as the shallow dose equivalent to any extremity or skin for the year. H is the dose equivalent averaged over the 1 cm <sup>2</sup> of skin receiving the maximum absorbed dose, D, reduced by the fraction, f, which is the irradiated area in cm <sup>2</sup> divided by 100 cm <sup>2</sup> (i.e., H=fD). In no case shall [835.205(b)(2)] a value of f less than 0.1 be used.”  - “Area of skin irradiated < 10 cm <sup>2</sup> – The non-uniform dose equivalent shall [835.205(b)(3)] be averaged over the 1 cm <sup>2</sup> of skin receiving the maximum dose. This dose equivalent shall [835.205(b)(3)]:  a. Be recorded in the individual’s occupational exposure history	This requirement is implemented though the CHG dosimetry program and through subcontract with providers that comply with this requirement.

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<p>receiving the maximum dose. This dose equivalent shall:</p> <p>5.5.10.1. Be recorded in the individual's occupational exposure history as a special entry; and</p> <p>5.5.10.2. Not be added to any other shallow dose equivalent to any extremity or skin recorded as the dose equivalent for the year.</p>	<p>as a special entry; and</p> <p>b. Not be added to any other shallow dose equivalent to any extremity or skin recorded as the dose equivalent for the year."</p>	
<p><b>36</b>                      Sec. 835.206(a)</p> <p>Limits for the embryo/fetus</p> <p>The dose equivalent limit for the embryo/fetus from the period of conception to birth, as a result of occupational exposure of a declared pregnant worker, is 0.5 rem (0.005 sievert).</p>	<p>Article 213.1 (<b>excerpt</b>)</p> <p>"Occupational dose limits are provided in Table 2-1 and shall [835.206(a)] not be exceeded"</p> <p>Table 2-1 (<b>excerpt</b>)</p> <p>"Type of exposure – Declared pregnant worker: Embryo/Fetus (internal + external) 0.5 rem per gestation period."</p> <p>TFRCM Glossary: (<b>excerpt</b>)</p> <p>Declared pregnant worker: "means a woman who has voluntarily declared to her employer, in writing, her pregnancy for the purpose of being subject to the occupational exposure limits to the embryo/fetus as provided in Article 215. This declaration may be revoked, in writing, at any time by the declared pregnant worker."</p> <p>Article 215.2 (<b>excerpt</b>)</p> <p>"For a declared pregnant worker who chooses to continue working as a radiological worker:</p> <p>a) The dose equivalent limit for the embryo/fetus from the period of conception to birth, as a result of occupational exposure of a declared pregnant worker, is 0.5 rem (0.005 sievert)[835.206(a)]."</p>	<p>This requirement is implemented though the CHG dosimetry program and through subcontract with providers that comply with this requirement.</p>
<p><b>37</b>                      Sec. 835.206(b)</p> <p>Substantial variation above a uniform exposure rate that would satisfy the limits provided in Sec. 835.206(a) shall be avoided.</p>	<p>Article 215.2.b (<b>excerpt</b>)</p> <p>"Substantial variation above a uniform exposure rate that would satisfy the limits provided in Table 2-1 shall [835.206(b)] be avoided."</p>	<p>CHG will apply the guidance of DOE G 441.1-6, "Evaluation and Control of Radiation Dose to the Embryo/Fetus Guide" of 29 April 1999, Section 4.2 guideline statement to maintain declared pregnant worker fetus dose below 50 mrem per month.</p> <p>This requirement is implemented though the CHG dosimetry program and through subcontract with</p>

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		providers that comply with this requirement.
<b>38</b> Sec. 835.206(c)  If the dose equivalent to the embryo/fetus is determined to have already exceeded 0.5 rem (0.005 sievert) by the time a worker declares her pregnancy, the declared pregnant worker shall not be assigned to tasks where additional occupational exposure is likely during the remaining gestation period.	Article 215.3  “If the dose equivalent to the embryo/fetus is determined to have already exceeded 0.5 rem (0.005 Sievert) by the time the worker declares her pregnancy, the declared pregnant worker shall [835.206(c)] not be assigned to tasks where additional occupational exposure is likely during the remaining gestation period.”	This requirement is implemented though the CHG dosimetry program and through subcontract with providers that comply with this requirement.
<b>39</b> Sec. 835.207  Occupational dose limits for minors  The dose equivalent limits for minors occupationally exposed to radiation and/or radioactive materials at a DOE activity are 0.1 rem (0.001 sievert) total effective dose equivalent in a year and 10% of the occupational dose limits specified at § 835.202(a)(3) and (a)(4).	Article 213.1 ( <b>excerpt</b> )  “Occupational dose limits are provided in Table 2-1 and shall [835.202(a)] not be exceeded.”  Table 2-1 ( <b>excerpt</b> )  Summary of Dose Limits  “Minors occupationally exposed: Whole Body TEDE (internal + external) 0.1 rem.”  “Minors occupationally exposed: Lens of the eye, skin, and extremities (is) 10% of General Employee Limits.”  TFRM Glossary: ( <b>excerpt</b> )  “Minor means an individual less than 18 years of age.”	This requirement is implemented though the CHG dosimetry program and through subcontract with providers that comply with this requirement.
<b>40</b> Sec. 835.208  Limits for members of the public entering a controlled area  The total effective dose equivalent limit for members of the public exposed to radiation and/or radioactive material during access to a controlled area is 0.1 rem (0.001 sievert) in a year.	Article 214 ( <b>excerpt</b> )  “The total effective dose equivalent limit for members of the public exposed to radiation and/or radioactive material during access to a controlled area is 0.1 rem in a year.”	CHG implements this requirement though the dosimetry program and through subcontract service providers.
<b>41</b> Sec. 835.209(a)  Concentrations of radioactive material in air  The derived air concentration (DAC) values given in appendices A and C of this part shall be used in the control of occupational exposures to airborne radioactive material.	Article 223.1  “The derived air concentration (DAC) values given in 10 CFR 35 Appendices A and C shall [835.209(a)] be used in the control of occupational exposures to airborne radioactive material.”	CHG implements this requirement through the workplace air sampling program, which uses the DAC values given in 10 CFR 835 Appendix A and C to control occupational exposures to airborne radioactive material.



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<b>42</b>	Sec. 835.209(b)  The estimation of internal dose shall be based on bioassay data rather than air concentration values unless bioassay data are:  (I)      Unavailable;  (II)     Inadequate; or  (III)    Internal dose estimates based on air concentration values are demonstrated to be as or more accurate.	Article 521.2  “The estimation of internal dose shall [835.209(b)] be based on bioassay data rather than air concentration values unless bioassay data are:  a. unavailable;  b. inadequate; or  c. internal dose estimates based on air concentration values are demonstrated to be as or more accurate.”	
<b>Subpart E      Monitoring of Individuals and Areas</b>			
<b>43</b>	Sec. 835.401(a)  General requirements  Monitoring of individuals and areas shall be performed to:  (1) Demonstrate compliance with the regulations in this part;  (2) Document radiological conditions;  (3) Detect changes in radiological conditions;  (4) Detect the gradual buildup of radioactive material;  (5) Verify the effectiveness of engineering and process controls in containing radioactive material and reducing radiation exposure; and  (6) Identify and control potential sources of individual exposure to radiation and/or radioactive material.	Article 221.2  “ Monitoring for contamination shall [835.401(a)(l), & 835.1102(d)] be performed using frisking equipment that can detect total contamination of at least the values specified in Table 2-2. DOE encourages the use of automatic monitoring units that meet the above requirements.”  Article 551 ( <b>excerpt &amp; modified</b> )  “Monitoring of individuals and areas shall [835.401(a)] be performed to:  a. Demonstrate compliance with the requirements of 10 CFR 835.”  b. Document radiological conditions;”  c. Detect changes in radiological conditions;”  d. Detect the gradual buildup of radioactive material;”  e. Verify the effectiveness of engineering and process controls in containing radioactive material and reducing radiation exposure; and”  f. Identify and control potential sources of individual exposure to radiation and/or radioactive material.”	The requirements of Section § 835.401 are subject to the graded approach through criteria established by CHG’s monitoring program. The program establishes administrative records for tracking and trending radiological conditions based on routine tasks (radiation survey reports). Task descriptions and work documents specify the frequency of radiological surveys. A workplace air-sampling program defines the criteria for use of continuous air monitors.

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<b>44</b> Sec. 835.401(b)  Instruments and equipment used for monitoring shall be: (1) Periodically maintained and calibrated on an established frequency; (2) Appropriate for the type(s), levels, and energies of the radiation(s) encountered; (3) Appropriate for existing environmental conditions; and (4) Routinely tested for operability.	Article 551.5 ( <b>excerpt and modified</b> )  “Instruments and equipment used for monitoring shall [10 CFR 835.401(b)] be: a. Periodically maintained and calibrated on an established frequency.” Article 562.1  “Radiological instruments and equipment shall [835.401(b)(1)] be periodically maintained and calibrated on an established frequency.” Article 562.3 (excerpt & modified) “Pocket and electronic dosimeters and area radiation monitors shall [835.401(b)] be calibrated in accordance with Article 562.1.” Article 563.1  “A program for preventive and corrective maintenance of radiological instrumentation shall be established and documented.” Article 563.3 “Radiological instruments shall [835.401(b)] undergo calibration prior to use following any preventive or corrective maintenance or any adjustment that voids the previous calibration. A battery change is not normally considered maintenance.” Article 552.4 “Radiation monitoring instruments shall [835.401(b)(2-3)] be capable of measuring ambient radiation dose rates for the purpose of controlling radiation exposures.” Article 551.5 ( <b>excerpt</b> )  “Instruments and equipment used for monitoring shall [835.401(b)] be: b. Appropriate for the type(s), levels and energies of the radiation(s) encountered.” Article 562.1 ( <b>excerpt</b> )  “Radiological instruments shall [835.401(b)(2-3)] be used only to	Cleaning of radiation monitoring equipment as part of preventive maintenance is not considered to void calibration.  CHG uses ANSI N323A (Rev 1997) for portable instruments, and uses ANSI N323 (Rev 1978) as guidance for other types of monitoring equipment.  Note: For the purposes of this RPP, functional tests of alarm systems are those systems used for occupational radiation protection and not process controls.

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	<p>measure the radiation for which their calibrations are valid.”</p> <p>Article 551.5 (excerpt)</p> <p>“Instruments and equipment used for monitoring shall [835.401(b)] be: c. Appropriate for the existing environmental conditions.”</p> <p>Article 562.4</p> <p>“The effects of environmental conditions, including interfering radiation, on an instrument shall [835.401(b)(3)] be known prior to use.”</p> <p>Article 551.5.d (excerpt)</p> <p>Instruments and equipment used for monitoring should be readily available and shall [10 CFR 835.401(b)] be:</p> <p>“d. Routinely tested for operability on a specified frequency commensurate with their application and design.”</p> <p>Article 551.5 (excerpt)</p> <p>“Performance testing requirements for portable radiological survey instruments are identified in ANSI N323. ANSI N323 guidance includes a daily, or prior to intermittent use, response check with a <math>\pm 20\%</math> variation. Compensatory actions should be established to ensure proper instrument performance when performance tests are not feasible, such as with instruments used to measure neutrons or tritium.”</p> <p>Article 555.7 (excerpt and modified)</p> <p>“The proper operation of continuous air monitoring equipment should be verified by performing an operational check. Operational checks should include positive air-flow indication, non-zero response to background activity, and internal check sources or 60 Hz electronic checks when available. Continuous air monitoring equipment should be verified by checking for instrument response with a check source or with ambient levels of radon and thoron daughters.”</p> <p>Article 562.5 (excerpt)</p> <p>“Functional tests should be used to assess instrumentation designs that include alarms or that involve a process control. A functional</p>	

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	test should be developed to periodically test all components involved in an alarm or trip function.”	
<b>45</b> Sec. 835.402(a)  Individual monitoring.  For the purpose of monitoring individual exposures to external radiation, personnel dosimetry shall be provided to and used by:	Article 511.1.a ( <b>excerpt</b> )  “1. For the purpose of monitoring individual exposures to external radiation, personnel dosimeters shall [835.402(a)] be provided to and used by:  a. Radiological workers who, under typical conditions, are likely to receive one or more of the following:  --An effective dose equivalent to the whole body of 0.1 rem (0.001 sievert) or more in a year;  Article 511.1.a ( <b>excerpt</b> ) “1. For the purpose of monitoring individual exposures to external radiation, personnel dosimeters shall [835.402(a)] be provided to and used by:  a. Radiological workers who, under typical conditions, are likely to receive one or more of the following;  A shallow dose equivalent to the skin to any extremity of 5 rems (0.05 sievert) or more in a year.”  Article 511.1.a ( <b>excerpt</b> ) “1. For the purpose of monitoring individual exposures to external radiation, personnel dosimeters shall [835.402(a)] be provided to and used by:  a. Radiological workers who, under typical conditions, are likely to receive one or more of the following;  --A lens of the eye dose equivalent of 1.5 rems (0.015 sievert) or more in a year.”  Article 511.1.b ( <b>excerpt</b> ) “1. For the purpose of monitoring individual exposures to external radiation, personnel dosimeters shall [835.402(a)] be provided to and used by:  b. Declared pregnant workers who are likely to receive from external sources a dose equivalent to the embryo/fetus in excess of	CHG implements this requirement through the CHG dosimetry program, which includes criteria for identifying individuals who require monitoring and through subcontracted dosimetry services.  “Are likely to receive” recognizes that professional judgment and experience will be used in making decisions in specific circumstances. [DOE G 441.1-1, Section 4., paragraph 5, March 1999.] This clarification applies to sections 835.402(a)(1) to (4).

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	<p>10 percent of the applicable limit at Table 2-1.”</p> <p>Article 511.1.c (<b>excerpt</b>)</p> <p>“1. For the purpose of monitoring individual exposures to external radiation, personnel dosimeters shall [835.402(a)] be provided to and used by:</p> <p>c. Occupationally exposed minors likely to receive a dose in excess of 50 percent of the applicable limits at Table 2-1 in a year from external sources.”</p> <p>Article 511.1.d (<b>excerpt</b>)</p> <p>“1. For the purpose of monitoring individual exposures to external radiation, personnel dosimeters shall [835.402(a)] be provided to and used by:</p> <p>d. Members of the public entering a controlled area likely to receive a dose in excess of 50 percent of the limit at Article 214 in a year from external sources”</p> <p>Article 511.1.e (<b>excerpt</b>)</p> <p>“1. For the purpose of monitoring individual exposures to external radiation, personnel dosimeters shall [835.402(a)] be provided to and used by:</p> <p>e. Individuals entering a high or very high radiation area.”</p> <p>Article 334.3 (<b>excerpt</b>)</p> <p>“c. Minimum requirements for each entry into High Radiation Areas are:</p> <p>1) Personnel and supplemental dosimeters shall [835.402(a)(5) be worn.”</p> <p>Article 334.4 (<b>excerpt and modified</b>)</p> <p>“Minimum requirements for each entry into High and Very High Radiation Areas where dose rates exist such that a worker could exceed a whole body dose of 1 rem in one hour shall [see 334.3] include those items listed in Article 334.3 and a determination of the worker’s current exposure, based on primary and supplemental dosimeter readings.”</p>	

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<b>46</b> Sec. 835.402(b)  External dose monitoring programs implemented to demonstrate compliance with § 835.402(a) shall be adequate to demonstrate compliance with the dose limits established in subpart C of this part and shall be: <ul style="list-style-type: none"> <li>(1) Accredited, or excepted from accreditation, in accordance with the DOE Laboratory Accreditation Program for Personnel Dosimetry; or</li> <li>(2) Determined by the Secretarial Officer responsible for environment, safety and health matters to have performance substantially equivalent to that of programs accredited under the DOE Laboratory Accreditation Program for Personnel Dosimetry.</li> </ul>	Article 512.1 ( <b>excerpt</b> )  “External dose monitoring programs implemented to demonstrate compliance with Article 511.1 shall [835.402(b)(1)] be adequate to demonstrate compliance with the dose limits in Chapter 2. The external dose monitoring program shall [835.402(b)(1)] be accredited in accordance with the DOE Laboratory Accreditation Program for Personnel Dosimetry.”	Personnel external dosimeters include, but are not limited to, TLDs, track etch dosimeters and neutron sensitive film.  The CHG dosimetry program and subcontracted dosimetry service implements a program compliant with Section § 835.402(b)(1); consequently, § 835.402(b)(2) is not applicable.
<b>47</b> Sec. 835.402(c)  For the purpose of monitoring individual exposures to internal radiation, internal dosimetry programs (including routine bioassay programs) shall be conducted for: <ul style="list-style-type: none"> <li>(1) Radiological workers who, under typical conditions, are likely to receive a committed effective dose equivalent of 0.1 rem (0.001 sievert) or more from all occupational radionuclide intakes in a year;</li> <li>(2) Declared pregnant workers likely to receive an intake or intakes resulting in a dose equivalent to the embryo/fetus in excess of 10 percent of the limit stated in Sec. 835.206(a);</li> <li>(3) Occupationally exposed minors who are likely to receive a dose in excess of 50 percent of the applicable limit stated at § 835.207 from all radionuclide intakes in a year; or</li> <li>(4) Members of the public entering a controlled area likely to receive a dose in excess of 50 percent of the limit stated at § 835.208 from all radionuclide intakes in a year.</li> </ul>	Article 521.1 ( <b>excerpt</b> )  “For the purpose of monitoring individual exposures to internal radiation, internal dosimetry programs (including routine bioassay programs) shall [835.402(c)] be conducted for: <ul style="list-style-type: none"> <li>a. Radiological workers who, under typical conditions, are likely to receive a committed effective dose equivalent of 0.1 rem (0.001 sievert) or more from all occupational radionuclide intakes in a year.”</li> </ul> Article 522.5  “Bioassay analyses shall [835.104; 835.402(c); Article 522.1] also be performed when any of the following occurs: <ul style="list-style-type: none"> <li>a. Facial or nasal contamination is detected that indicates a potential for internal contamination</li> <li>b. Airborne monitoring indicates the potential for intakes exceeding 100 mrem committed effective dose equivalent</li> <li>c. When directed by the Radiological Control Organization.”</li> </ul> Article 521.1 ( <b>excerpt</b> )  “For the purpose of monitoring individual exposures to internal radiation, internal dosimetry programs (including routine bioassay programs) shall [835.402(c)] be conducted for:	CHG implements this requirement through the CHG dosimetry program, which includes criteria for identifying individuals who require monitoring and through subcontracted dosimetry services.  Note: It is not technically feasible for CHG’s routine bioassay program to detect certain radionuclides at levels sufficiently low to meet this requirement, (for example, Plutonium). For hard to detect radionuclides, additional measures are taken to ensure this requirement is met. Field indicators (i.e., facial and skin contamination’s, positive nasal smears, and presence of Pu) are used to invoke the non-routine bioassay program. This approach is consistent with DOE G 441.1-3, “Internal Dosimetry Program Guide”, Section 4.2.2.  Workers who “are likely to receive” recognizes that professional judgment

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	<p>b. Declared pregnant workers likely to receive an intake or intakes resulting in a dose equivalent to the embryo/fetus in excess of 10 percent of the limit stated at Table 2-1.”</p> <p>Article 521.1 (<b>excerpt</b>)</p> <p>“For the purpose of monitoring individual exposures to internal radiation, internal dosimetry programs (including routine bioassay programs) shall [835.402(c)]be conducted for:</p> <p>c. Occupationally exposed minors who are likely to receive a dose in excess of 50 percent of the applicable limit stated at Table 2-1 from all radionuclide intakes in a year.”</p> <p>Article 214.a (<b>excerpt</b>)</p> <p>“Minors are prohibited access to Contamination Areas, High Contamination Areas, Radiation Areas, High Radiation Areas, Very High Radiation Areas, and Soil Contamination Areas.”</p> <p>Article 521.1 (<b>excerpt</b>)</p> <p>“For the purpose of monitoring individual exposures to internal radiation, internal dosimetry programs (including routine bioassay programs) shall [835.402(c)]be conducted for:</p> <p>d. Members of the public entering a controlled area likely to receive a dose in excess of 50 percent of the limit stated at Article 214 from all radionuclide intakes in a year.”</p>	<p>and experience will be used in making decisions in specific circumstances. [DOE G 441.1-1, Section 4., paragraph 5, March 1999.] This clarification applies to sections 835.402(c)(1) to (4).</p> <p>Clarification to sections § 835.402(c)(3) and § 835.402(c)(4): Administrative controls are established to limit the likelihood of a minor receiving an occupational dose above the established limits of § 835.207.</p>
<p><b>48</b>                      Sec. 835.402(d)</p> <p>Internal dose monitoring programs implemented to demonstrate compliance with § 835.402(c) shall be adequate to demonstrate compliance with the dose limits established in subpart C of this part and shall be:</p> <p>(1) Accredited, or excepted from accreditation, in accordance with the DOE Laboratory Accreditation Program for Radiobioassay; or,</p> <p>(2) Determined by the Secretarial Officer responsible for environment, safety and health matters to have performance substantially equivalent to that of programs accredited under the DOE Laboratory Accreditation Program for Radiobioassay.</p>	<p>Article 522 (<b>excerpt</b>)</p> <p>“Internal dose monitoring programs implemented to demonstrate compliance with Article 521.1 a, b, c, and d shall [835.402(d)(1)] be adequate to demonstrate compliance with the dose limits established in Table 2-1. The internal dose monitoring programs shall [835.402(d)(1)] be accredited in accordance with DOE Laboratory Accreditation Program for Radiobioassay.</p> <p>Article 522.1 (<b>excerpt</b>)</p> <p>“A technical basis document shall [835.402(d)] be developed for the internal dosimetry program.”</p>	<p>CHG is committed to using a laboratory that meets the DOE Laboratory Accreditation Program for Radiobioassay requirement as part of § 835.402(d)(1).</p> <p>It is not anticipated that this requirement would be applicable. However, CHG agrees to comply with § 835.402(d)(2) if the provisions of the DOE Laboratory Accreditation Program for Radiobioassay are not satisfied.</p> <p>Note: It is not technically feasible for CHG’s routine bioassay program to</p>

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		detect certain radionuclides at levels sufficiently low to meet this requirement, (for example, Plutonium). For hard to detect radionuclides, additional measures are taken to ensure this requirement is met. Field indicators (i.e., facial and skin contamination's, positive nasal smears, and presence of Pu) are used to invoke the non-routine bioassay program. This approach is consistent with DOE G 441.1-3, "Internal Dosimetry Program Guide", Section 4.2.2.
<b>49</b> Sec. 835.403(a)  Air monitoring  Monitoring of airborne radioactivity shall be performed:  (1) Where an individual is likely to receive an exposure of 40 or more DAC-hours in a year; or  (2) As necessary to characterize the airborne radioactivity hazard where respiratory protective devices for protection against airborne radionuclides have been prescribed.	Article 555.2 ( <b>excerpt</b> ) "Monitoring of airborne radioactivity shall [835.403(a)] be performed:  a. Where an individual is likely to receive an exposure of 40 or more DAC-hours in a year."  Article 555.2 ( <b>excerpt</b> ) "Monitoring of airborne radioactivity shall [835.403(a)] be performed:  b. As necessary to characterize the airborne radioactivity hazard where respiratory protective devices for protection against airborne radionuclides have been prescribed."	The requirements of Section § 835.403 are met through the workplace air sampling program, which defines criteria for air sampling, including continuous air monitoring, record air sampling, and grab air samples.  "An individual is likely to receive" recognizes that professional judgment and experience will be used in making decisions in specific circumstances. [DOE G 441.1-1, Section 4, paragraph 5, March 1999.]
<b>50</b> Sec. 835.403(b)  Real-time air monitoring shall be performed as necessary to detect and provide warning of airborne radioactivity concentrations that warrant immediate action to terminate inhalation of airborne radioactive material.	Article 555.3 "Real-time air monitoring shall [835.403(b)] be performed as necessary to detect and provide warning of airborne radioactivity concentrations that warrant immediate action to terminate inhalation of airborne radioactive material."  Article 555.6 "Continuous air monitoring equipment required by Article 555.3 shall [835.403(b)] have alarm capability and sufficient sensitivity to alert personnel that immediate action is necessary in order to minimize or terminate inhalation exposures."	



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<b>51</b> Sec. 835.405(a)  Receipt of packages containing radioactive materials  If packages containing quantities of radioactive material in excess of a Type A quantity (as defined at 10 CFR 71.4) are expected to be received from radioactive material transportation, arrangements shall be made to either: <ol style="list-style-type: none"> <li>(1) Take possession of the package when the carrier offers it for delivery; or</li> <li>(2) Receive notification as soon as practicable after arrival of the package at the carrier's terminal and to take possession of the package expeditiously after receiving such notification.</li> </ol>	Article 423.14 ( <b>excerpt</b> )  "If packages containing quantities of radioactive material in excess of a Type A quantity (as defined at 10 CFR 71.4) are expected to be received from radioactive material transportation, arrangements shall [835.405(a)] be made to either: <ol style="list-style-type: none"> <li>a. Take possession of the package when the carrier offers it for delivery, or</li> <li>b. Receive notification as soon as practicable after arrival of the package at the carrier's terminal and to take possession of the package expeditiously after receiving such notification."</li> </ol>	The requirements of Section § 835.405 are met through a process for shipment, transportation, and receipt of radioactive material that includes receipt survey and monitoring activities.
<b>52</b> Sec. 835.405(b)  Upon receipt from radioactive material transportation, external surfaces of packages known to contain radioactive material shall be monitored if the package: <ol style="list-style-type: none"> <li>(1) Is labeled with a Radioactive White I, Yellow II, or Yellow III label (as specified at 49 CFR 172.403 and 172.436-440); or</li> <li>(2) Has been transported as low specific activity material (as defined at 10 CFR 71.4) on an exclusive use vehicle (as defined at 10 CFR 71.4); or</li> <li>(3) Has evidence of degradation, such as packages that are crushed, wet, or damaged.</li> </ol>	Article 423.15 ( <b>excerpt</b> )  "Upon receipt from radioactive material transportation, external surfaces of packages known to contain radioactive material shall [835.405(b)] be monitored if the package: <ol style="list-style-type: none"> <li>a. Is labeled with a Radioactive White I, Yellow II, or Yellow III label (as specified at 49 CFR 172.403 and 172.436-440)."</li> </ol> Article 423.15 ( <b>excerpt</b> )  "Upon receipt from radioactive material transportation, external surfaces of packages known to contain radioactive material shall [835.405(b)] be monitored if the package: <ol style="list-style-type: none"> <li>b. Has been transported as low specific activity material (as defined at 10 CFR 71.4) on an exclusive use vehicle (as defined at 10 CFR 71.4)."</li> </ol> Article 423.15 ( <b>excerpt</b> )  "Upon receipt from radioactive material transportation, external surfaces of packages known to contain radioactive material shall [835.405(b)] be monitored if the package: <ol style="list-style-type: none"> <li>c. Has evidence of degradation, such as packages that are crushed, wet, or damaged."</li> </ol>	

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<b>53</b> Sec. 835.405(c)  The monitoring required by paragraph (b) of this section shall include: <ul style="list-style-type: none"> <li>(1) Measurements of removable contamination levels, unless the package contains only special form (as defined at 10 CFR 71.4) or gaseous radioactive material; and</li> <li>(2) Measurements of the radiation levels, unless the package contains less than a Type A quantity (as defined at 10 CFR 71.4) of radioactive material.</li> </ul>	Article 423.16 ( <b>excerpt and modified</b> )  “The monitoring required by Article 423.14 shall [835.405(c)] include: <ul style="list-style-type: none"> <li>a. Measurements of removable contamination levels, unless the package contains only special form (as defined at 10 CFR 71.4) or gaseous radioactive material; and”</li> </ul> Article 423.16 ( <b>excerpt and modified</b> )  “The monitoring required by Article 423.14 shall [835.405(c)] include: <ul style="list-style-type: none"> <li>b. Measurements of the radiation levels, unless the package contains less than a Type A quantity (as defined at 10 CFR 71.4) of radioactive material.”</li> </ul>	
<b>54</b> Sec. 835.405(d)  The monitoring required by paragraph (b) of this section shall be completed as soon as practicable following receipt of the package, but not later than 8 hours after the beginning of the working day following receipt of the package.	Article 423.17 ( <b>excerpt</b> )  “The monitoring required by Article 423.14 shall [835.405(d)] be completed as soon as practicable following receipt of the package, but no later than 8 hours after the beginning of the working day following the receipt of the package.”	A ‘working day’ is considered the interval of time within each 24-hour period during which the building or area is routinely occupied or available for operations other than emergency activities.
<b>Subpart F                      Entry Control Program</b>		
<b>55</b> Sec. 835.501(a)  Radiological areas.  Personnel entry control shall be maintained for each radiological area.	Article 330.1 ( <b>excerpt</b> )  “The following are general requirements for an entry control program: <ul style="list-style-type: none"> <li>1. Personnel entry control shall [835.501(a)] be maintained for each radiological area.”</li> </ul>	CHG considers entry control to include posting, barricades, control devices on entryways, visual and audible alarms, administrative procedures, locked entryways and training.
<b>56</b> Sec. 835.501(b)  The degree of control shall be commensurate with existing and potential radiological hazards within the area.	Article 330.2 ( <b>excerpt</b> )  “The following are general requirements for an entry control program: <ul style="list-style-type: none"> <li>2. The degree of control shall [835.501(b)] be commensurate with existing and potential radiological hazards within the area.”</li> </ul>	The CHG entry controls mentioned above (§ 835.501(a)) are used to the degree commensurate with existing and potential radiological hazards within the area.

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<b>57</b> Sec. 835.501(c)  One or more of the following methods shall be used to ensure control:  (1)    Signs and barricades; (2)    Control devices on entrances; (3)    Conspicuous visual and/or audible alarms; (4)    Locked entrance ways; or (5)    Administrative controls.	Article 231.10 ( <b>modified and excerpted</b> )  Physical barriers should be placed so that they are clearly visible from all (entry approaches).  Article 330.3 ( <b>excerpt</b> )  “One or more of the following methods shall [835.501(c)] be used to ensure control: a. Signs and barricades.”  Article 330.3 ( <b>excerpt</b> )  “One or more of the following methods shall [835.501(c)] be used to ensure control: b. Control devices on entrances.”  Appendix 3B.1.a (excerpt & modified) Physical Access Controls for High and Very High Radiation Areas “One or more of the following controls should be used for each entrance or access point to a High Radiation Area. a. A control device that prevents entry to the area when high radiation levels exist or that, upon entry, causes the radiation level to be reduced below the level that defines a High Radiation Area.”  Appendix 3B.2 ( <b>excerpt</b> )  “In addition to the above requirements, additional measures shall [835.502(c)] be implemented to ensure individuals are not able to gain unauthorized or inadvertent access to Very High Radiation Areas when dose rates are in excess of the posting requirements of Table 2-3.”  Article 330.3 ( <b>excerpt</b> )  “One or more of the following methods shall [835.501(c)] be used to ensure control: c. Conspicuous visual and/or audible alarms.”  Appendix 3B.1.f ( <b>excerpt</b> )  “One or more of the following controls should be used for each	

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	<p>entrance or access point to a High Radiation Area.</p> <p>g. A control device that will automatically generate audible and visual alarm signals to alert personnel in the area before use or operation of the radiation source and in sufficient time to permit evacuation of the area or activation of a secondary control device that will prevent use or operation of the source.”</p> <p>Article 330.3 (<b>excerpt</b>)</p> <p>“One or more of the following methods shall [835.501(c)] be used to ensure control:</p> <p>d. Locked entrance ways.”</p> <p>Article 334.7</p> <p>“The number, issue, and use of keys shall [835.502(b)(4)] be strictly controlled where locked entryways are used to control access to High and Very High Radiation Areas.”</p> <p>Appendix 3B.1.d (<b>excerpt</b>)”</p> <p>“One or more of the following controls should be used for each entrance or access point to a High Radiation Area.</p> <p>c. Entryways that are locked. During periods when access to the area is required, positive control over each entry is maintained.”</p> <p>Article 330.3 (<b>excerpt</b>)</p> <p>“One or more of the following methods shall [835.501(c)] be used to ensure control:</p> <p>e. Administrative controls.”</p> <p>334.10 (<b>excerpt</b>) [for RA, HRA, &amp; VHRA]</p> <p>“Written procedures should be implemented to ensure the effectiveness and operability of barricades, devices, alarms, and locks.”</p> <p>Article 335.8 (<b>excerpt</b>)[for CA, HCA, &amp; ARA]</p> <p>“Administrative procedures shall [835.104, 10 CFR 835, Subpart F] be developed as necessary to implement area access controls.”</p>	

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	Article 341.1 “Radiological work activities shall [835.501(d)] be conducted as specified by the controlling technical work document and Radiological Work Permit.”	
<b>58</b> Sec. 835.501(d)  Written authorizations shall be required to control entry into and perform work within radiological areas. These authorizations shall specify radiation protection measures commensurate with the existing and potential hazards.	Article 321 ( <b>excerpt</b> ) “Written authorizations shall [835.501(d)] be required to control entry into and perform work within radiological areas.”  Article 321 ( <b>excerpt</b> ) “These authorizations shall [835.501(d)] specify radiation protection measures commensurate with the existing and potential hazards.”	
<b>59</b> Sec. 835.501(e)  No control(s) shall be installed at any radiological area exit that would prevent rapid evacuation of personnel under emergency conditions.	Article 231.10 ( <b>excerpt</b> ) “These barriers shall [835.501(e) and 835.502(d)] be set up such that they do not impede the intended use of emergency exits or evacuation routes.”  Article 330.5 No control(s) shall [835.501(e)] be installed at any radiological area exit that would prevent rapid evacuation of personnel under emergency conditions.  Appendix 3B.3 ( <b>excerpt</b> ) “No control(s) shall [835.502(d)] be established in a High or Very High Radiation Area that would prevent rapid evacuation of personnel.”	
<b>60</b> Sec. 835.502(a)  High and very high radiation areas.  The following measures shall be implemented for each entry into a high radiation area:  (1) The area shall be monitored as necessary during access to determine the exposure rates to which the individuals are exposed; and  (2) Each individual shall be monitored by a supplemental dosimetry device or other means capable of providing an	Article 334.3 ( <b>excerpt</b> ) “Minimum requirements for each entry into High Radiation Areas shall [HNF] include the following.”  Article 334.3.c ( <b>excerpt</b> ) “2) The area shall [835.502(a)(1)] be monitored as necessary during access to determine the dose rates to which the individuals are exposed.”  Article 334.3.c ( <b>excerpt</b> )	

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immediate estimate of the individual's integrated deep dose equivalent during the entry.	<p>"Minimum requirements for each entry into High Radiation Areas are:"</p> <p>"(3) Each individual shall [835.502(a)(2)] be monitored by a supplemental dosimetry device or other means capable of providing an immediate estimate of the individual's integrated deep dose equivalent during the entry."</p>	
<p><b>61</b>                      Sec. 835.502(b)</p> <p>Physical controls</p> <p>One or more of the following features shall be used for each entrance or access point to a high radiation area where radiation levels exist such that an individual could exceed a deep dose equivalent to the whole body of 1 rem (0.01 sievert) in any one hour at 30 centimeters from the source or from any surface that the radiation penetrates:</p> <ol style="list-style-type: none"> <li>(1) A control device that prevents entry to the area when high radiation levels exist or upon entry causes the radiation level to be reduced below that level defining a high radiation area;</li> <li>(2) A device that functions automatically to prevent use or operation of the radiation source or field while individuals are in the area;</li> <li>(3) A control device that energizes a conspicuous visible or audible alarm signal so that the individual entering the high radiation area and the supervisor of the activity are made aware of the entry;</li> <li>(4) Entryways that are locked. During periods when access to the area is required, positive control over each entry is maintained;</li> <li>(5) Continuous direct or electronic surveillance that is capable of preventing unauthorized entry;</li> <li>(6) A control device that will automatically generate audible and visual alarm signals to alert personnel in the area before use or operation of the radiation source and in sufficient time to permit evacuation of the area or activation of a secondary control device that will prevent use or operation of the source.</li> </ol>	<p>Appendix 3B.1 (<b>excerpt</b>)</p> <p>"1. One or more of the following controls should be used for each entrance or access point to a High Radiation Area and shall [835.502(b)] be used for each entrance or access point to a High Radiation Area where radiation levels exist such that an individual could exceed a deep dose equivalent to the whole body of 1 rem (0.01 sievert) in any one hour at 30 centimeters from the source or from any surface the radiation penetrates."</p> <ol style="list-style-type: none"> <li>(1) "A control device that prevents entry to the area when high radiation levels exist or that upon entry causes the radiation level to be reduced below the level that defines a High Radiation Area."</li> <li>(2) A device that functions automatically to prevent use or operation of the radiation source or field while individuals are in the area."</li> <li>(3) A control device that energizes a conspicuous visible or audible alarm signal so that the individual entering the High Radiation Area and the supervisor of the activity are made aware of the entry."</li> <li>(4) Entryways that are locked. During periods when access to the area is required positive control over each entry is maintained."</li> <li>(5) Continuous direct or electronic surveillance that is capable of preventing unauthorized entry."</li> <li>(6) A control device that will automatically generate audible and visual alarm signals to alert personnel in the area before use or operation of the radiation source and in sufficient time to permit evacuation of the area or activation of a secondary control device that will prevent use or operation of the</li> </ol>	

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	<p>source.”</p> <p>TFRCM Glossary (<b>excerpt</b>):</p> <p>High radiation area: “Means any area, accessible to individuals, in which radiation levels could result in an individual receiving a deep dose equivalent in excess of 0.1 rem (0.001 Sv) in 1 hour at 30 centimeters from the radiation source or from any surface that the radiation penetrates.”</p>	
<p><b>62</b>                      Sec. 835.502(c)</p> <p>Very high radiation areas</p> <p>In addition to the above requirements, additional measures shall be implemented to ensure individuals are not able to gain unauthorized or inadvertent access to very high radiation areas.</p>	<p>Article 334.5 (<b>modified and excerpted</b>)</p> <p>“Minimum requirements for entry into Very High Radiation Areas shall [CHG/835.502(a)] include the controls specified in Articles 334.3. In addition a survey shall [HNF] be made prior to the first entry into a Very High Radiation Area after the source has been secured or shielded to verify the very high radiation field has been terminated.”</p> <p>Appendix 3B.2 (modified)</p> <p>In addition to the above requirements, additional measures shall [835.502(c)] be implemented to ensure individuals are not able to gain unauthorized or inadvertent access to Very High Radiation Areas when dose rates are in excess of the posting requirements of Table 2-3.</p> <p>TFRCM Glossary: Very High Radiation Area:</p> <p>“Means any area, accessible to individuals, in which radiation levels could result in an individual receiving an absorbed dose in excess of 500 rads (5 grays) in one hour at 1 meter from a radiation source or from any surface that the radiation penetrates.”</p>	<p>CHG does not routinely manage any facilities identified within the scope of § 835.502(c). Should facilities be identified within this scope the requirements of § 835.502(c) will be followed</p>
<p><b>63</b>                      Sec. 835.502(d)</p> <p>No control(s) shall be established in a high or very high radiation area that would prevent rapid evacuation of personnel.</p>	<p>Appendix 3B.3 (<b>excerpt</b>)</p> <p>“No control(s) shall [835.502(d)] be established in a High or Very High Radiation Area that would prevent rapid evacuation of personnel.”</p>	<p>CHG accepts § 835.502(d) as written.</p>

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<b>Subpart G</b>	<b>Posting and Labeling</b>		
<b>64</b>	Sec. 835.601(a)  General requirements  Except as otherwise provided in this subpart, postings and labels required by this subpart shall include the standard radiation warning trefoil in black or magenta imposed upon a yellow background.	<p>Article 231.2 (<b>excerpt</b>)</p> <p>“Signs shall [835.601(a)] contain the standard radiation symbol colored magenta or black on a yellow background.”</p> <p>Article 231.13 (<b>excerpt and modified</b>)</p> <p>“The posting requirements in 10 CFR 835 may be modified to reflect the special considerations of DOE activities conducted at private residences or businesses. Such modifications shall [835.601(c)] provide the same level of protection to individuals as the existing provisions in 10 CFR 835.”</p> <p>Article 412.3 (<b>excerpt and modified</b>)</p> <p>“Labels shall [835.601(a)] include the standard radiation warning trefoil in black or magenta imposed upon a yellow background. Radioactive material labels applied to sealed radioactive sources may be excepted from these color specifications.”</p> <p>Article 412.6 (<b>excerpt and modified</b>)</p> <p>“The labeling requirements of 10 CFR 835 may be modified to reflect the special considerations of DOE activities conducted at private residences or businesses.”</p>	
<b>65</b>	Sec. 835.601(b)  Signs required by this subpart shall be clearly and conspicuously posted and may include radiological protection instructions.	<p>Article 231.3 (<b>excerpt</b>)</p> <p>“Signs shall [835.601(b)] be conspicuously posted, clearly worded, and, where appropriate, may include radiological control instructions.”</p>	
<b>66</b>	Sec. 835.601(c)  The posting and labeling requirements in this subpart may be modified to reflect the special considerations of DOE activities conducted at private residences or businesses. Such modifications shall provide the same level of protection to individuals as the existing provisions in this subpart.	<p>Article 231.13 (<b>excerpt &amp; modified</b>)</p> <p>“The posting requirements in 10 CFR 835 may be modified to reflect the special considerations of DOE activities conducted at private residences or businesses.”</p> <p>Article 412.6 (<b>excerpt and modified</b>)</p> <p>The labeling requirements of 10 CFR 835 may be modified to reflect the special considerations of DOE activities conducted at private residences or businesses.</p> <p>Article 371.10 (<b>excerpt and modified</b>)</p>	CHG does not anticipate conducting radiological activities at private businesses or residences. Should circumstances occur where this would be required, the requirements of § 835.601(c) will be followed.



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	<p>“For the following specific subject areas, the radiological requirements of 10 CFR 835 may be modified by the limited application of the provisions of Article 113.3.10. Postings of privately owned and adjacent property.”</p> <p>Article 231.13 (<b>excerpt and modified</b>)</p> <p>“Such modifications shall [835.601(c)] provide the same level of protection to individuals as the existing provisions in 10 CFR 835.”</p> <p>Article 412.6 (<b>excerpt and modified</b>)</p> <p>“The labeling requirements of 10 CFR 835 may be modified to reflect the special considerations of DOE activities conducted at private residences or businesses.”</p>	
<p><b>67</b>                      Sec. 835.602(a)</p> <p>Controlled areas.</p> <p>Each access point to a controlled area (as defined in Sec. 835.2) shall be posted, whenever radiological areas or radioactive material areas exist in the area. Individuals who enter only controlled areas without entering radiological areas or radioactive material areas are not expected to receive a total effective dose equivalent of more than 0.1 rem (0.001 sievert) in a year.</p>	<p>Article 232.1 (<b>excerpt</b>)</p> <p>“Each access point to a controlled area shall [835.602(a)] be posted whenever radiological areas or radioactive material areas exist in the area.”</p> <p>Article 232.1 (<b>excerpt</b>)</p> <p>“Individuals who enter only controlled areas without entering radiological areas or radioactive material areas are not expected to receive a total effective dose equivalent of more than 0.1 rem in a year.”</p> <p>Article 551 (<b>excerpt &amp; modified</b>)</p> <p>“Monitoring of individuals and areas shall [835.401(a)] be performed to:</p> <p>a. Demonstrate compliance with the requirements of 10 CFR 835.”</p>	
<p><b>68</b>                      Sec. 835.602(b)</p> <p>Signs used for this purpose may be selected by the contractor to avoid conflict with local security requirements.</p>	<p>Article 232.2 (<b>excerpt</b>)</p> <p>“The contractor may select the type of sign used to avoid conflict with local security requirements.”</p>	

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<b>69</b>	Sec. 835.603	Article 234.1 ( <b>excerpt</b> ) “Areas shall [835.601 & 835.603] be posted to alert personnel to the presence of external radiation in accordance with Table 2-3.” Article 234.7 ( <b>excerpt</b> ) “Dose received in an hour may be used as the criterion for posting.” Table 2-3 ( <b>excerpt</b> ) Criteria for Posting Radiation Areas “Radiation Area: Dose Rate Criteria - > 0.005 rem/hr and ≤ 0.1 rem/hr at 30 cm: Posting – “CAUTION, RADIATION AREA”.” TFRCM Glossary ( <b>excerpt</b> ): Radiation area: “Means any area, accessible to individuals, in which radiation levels could result in an individual receiving a deep dose equivalent in excess of 0.005 rem (0.05 mSv) in one hour at 30 centimeters from the radiation source or from any surface that the radiation penetrates.” Article 234.1 ( <b>excerpt</b> ) “Areas shall [835.601 & 835.603] be posted to alert personnel to the presence of external radiation in accordance with Table 2-3.” Article 234.7 (excerpt & modified) “Dose received in an hour may be used as the criterion for posting; the unit “rad” is associated with dose rates that pose an immediate danger.” Table 2-3 ( <b>excerpt</b> ) Criteria for Posting Radiation Areas “High Radiation Area: Dose Rate Criteria - > 0.1 rem/hr at 30 cm and ≤ 500 rad/hr at 100 cm: Posting – “DANGER, HIGH RADIATION AREA”.” TFRCM Glossary ( <b>excerpt</b> ):	

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	<p>High radiation area: “Means any area, accessible to individuals, in which radiation levels could result in an individual receiving a deep dose equivalent in excess of 0.1 rem (0.001 Sv) in 1 hour at 30 centimeters from the radiation source or from any surface that the radiation penetrates.”</p> <p>Article 234.1 (<b>excerpt</b>)</p> <p>“Areas shall [835.601 &amp; 835.603] be posted to alert personnel to the presence of external radiation in accordance with Table 2-3.”</p> <p>Article 234.7 (<b>excerpt</b>)</p> <p>“Dose received in an hour may be used as the criterion for posting; the unit “rad” is associated with dose rates that pose an immediate danger.”</p> <p>Table 2-3 (<b>excerpt</b>)</p> <p>Criteria for Posting Radiation Areas</p> <p>“Very High Radiation Areas: Dose Rate Criteria – &gt; 500 rad/hr at 100 cm: Posting – “GRAVE DANGER, VERY HIGH RADIATION AREA”.”</p> <p>TFRCM Glossary (<b>excerpt</b>):</p> <p>Very high radiation area: “Means any area, accessible to individuals, in which radiation levels could result in an individual receiving an absorbed dose in excess of 500 rads (5 grays) in one hour at 1 meter from a radiation source or from any surface that the radiation penetrates.”</p> <p>Article 235.1 (<b>excerpt</b>)</p> <p>“Areas shall [835.603(d-f)] be posted to alert personnel to contamination in accordance with Table 2-4.”</p> <p>Article 223.2 (<b>excerpt</b>)</p> <p>“Any area, accessible to individuals, where: 1) the concentration of airborne radioactivity, above natural background, exceeds or is likely to exceed the derived air concentration (DAC) values listed in appendix A or appendix C of 10 CFR 835; or 2) an individual present in the area without respiratory protection could receive an intake exceeding 12 DAC-hours in a week shall [835.2] be posted</p>	

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	<p>as an Airborne Radioactivity Area.”</p> <p>Table 2-4 (<b>excerpt</b>)</p> <p>Criteria for Posting Contamination, High Contamination and Airborne Radioactivity Areas</p> <p>“Airborne Radioactivity: Criteria – Concentrations 1 DAC or 12 DAC-hours/week: Posting – “CAUTION, AIRBORNE RADIOACTIVITY AREA”.”</p> <p>TFRCM Glossary (<b>excerpt and modified</b>):</p> <p>Airborne radioactivity area: “Any area, accessible to individuals, where:</p> <ol style="list-style-type: none"> <li>1) The concentration of airborne radioactivity, above natural background, exceeds or is likely to exceed the derived air concentration (DAC) values listed in appendix A or appendix C of 10 CFR 835; or</li> <li>2) An individual present in the area without respiratory protection could receive an intake exceeding 12 DAC-hours in a week.”</li> </ol> <p>Article 222.1 (<b>excerpt</b>)</p> <p>“ Any area in which contamination levels exceed the values specified in Table 2-2 shall [835.1102(b)] be controlled in a manner commensurate with the physical and chemical characteristics of the contaminant, the radionuclides present, and the fixed and removable surface contamination levels.”</p> <p>Article 235.1 (<b>excerpt</b>)</p> <p>“Areas shall [835.603(d-f)] be posted to alert personnel to contamination in accordance with Table 2-4.”</p> <p>Table 2-4 (<b>excerpt</b>)</p> <p>“Criteria for Posting Contamination, High Contamination and Airborne Radioactivity Areas</p> <p>Contamination: Criteria – Contamination levels (dpm/100 cm<sup>2</sup>) &gt; 1 time but ≤100 times Table 2-2 values:</p> <p>Posting – “CAUTION, CONTAMINATION AREA”.</p>	

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	<p>TFRCM Glossary (<b>excerpt</b>):</p> <p>Contamination area: “Means any area, accessible to individuals, where removable surface contamination levels exceed or are likely to exceed the removable surface contamination values specified in Table 2-2 of the TFRCM, but do not exceed 100 times those values.”</p> <p>Article 235.1 (<b>excerpt</b>)</p> <p>“Areas shall [835.603(d-f)] be posted to alert personnel to contamination in accordance with Table 2-4.”</p> <p>Table 2-4 (<b>excerpt</b>)</p> <p>Criteria for Posting Contamination, High Contamination and Airborne Radioactivity Areas</p> <p>“High Contamination: Criteria – Removable contamination levels (dpm/100 cm<sup>2</sup>) &gt; 100 times Table 2-2 values:</p> <p>Posting – “DANGER, HIGH CONTAMINATION AREA”.</p> <p>TFRCM Glossary (<b>excerpt</b>):</p> <p>High contamination area</p> <p>“Means any area accessible to individuals, where removable surface contamination levels exceed or are likely to exceed 100 times the removable surface contamination values specified in Chapter 2, Table 2-2</p> <p>Article 236.1 (<b>excerpt</b>)</p> <p>“The words “Caution, Radioactive Material(s)” shall [835.603(g)] be posted at each radioactive material area.”</p> <p>TFRCM Glossary (<b>excerpt</b>):</p> <p>Radioactive Material Area: “Means any area within a controlled area, accessible to individuals, in which items or containers of radioactive material exist and the total activity of radioactive material exceeds the applicable values provided in Appendix 4A of the TFRCM.”</p>	

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<b>70</b> Sec. 835.604(a)  Exceptions to posting requirements  Areas may be excepted from the posting requirements of § 835.603 for periods of less than 8 continuous hours when placed under continuous observation and control of an individual knowledgeable of, and empowered to implement, required access and exposure control measures.	Article 231.14 ( <b>Modified</b> )  “Areas may be excepted from the posting requirements of 10 CFR 835 for periods of less than 8 continuous hours when placed under continuous observation and.”  Article 231.14 ( <b>Modified</b> )  “Control of an individual knowledgeable of, and empowered to implement, required access and exposure control measures.”	
<b>71</b> Sec. 835.604(b)  Areas may be excepted from the radioactive material area posting requirements of § 835.603(g) when: <ul style="list-style-type: none"> <li>(1) Posted in accordance with § 835.603(a) through (f); or</li> <li>(2) Each item or container of radioactive material is labeled in accordance with this subpart such that individuals entering the area are made aware of the hazard; or</li> <li>(3) The radioactive material of concern consists solely of structures or installed components which have been activated (i.e., such as by being exposed to neutron radiation or particles produced in an accelerator).</li> </ul>	Article 236.3 ( <b>excerpt</b> )  “Areas may be excepted from the radioactive material area posting when: <ul style="list-style-type: none"> <li>a. Posted as a radiological area; or”</li> <li>b. Each item or container of radioactive material is labeled in accordance with the TFRCM such that individuals entering the area are made aware of the hazard; or”</li> <li>c. The radioactive material of concern consists solely of structures or installed components which have been activated (i.e., such as being exposed to neutron radiation or particles produced by an accelerator).”</li> </ul>	
<b>72</b> Sec. 835.604(c)  Areas containing only packages received from radioactive material transportation labeled and in non-degraded condition need not be posted in accordance with § 835.603 until the packages are monitored in accordance with § 835.405.	Article 231.16 ( <b>excerpt</b> )  “Areas containing only packages received from radioactive material transportation labeled and in non-degraded condition need not be posted in accordance with Articles 234, 235, and 236 until the packages are monitored in accordance with Articles 423.”	

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<b>73</b> Sec. 835.605  Labeling items and containers  Except as provided in § 835.606, each item or container of radioactive material shall bear a durable, clearly visible label bearing the standard radiation warning trefoil and the words "Caution, Radioactive Material" or "Danger, Radioactive Material". The label shall also provide sufficient information to permit individuals handling, using, or working in the vicinity of the items or containers, to take precautions to avoid or control exposures.	Article 412.1 ( <b>excerpt</b> )  "Except as provided in Articles 411.2 and 412.2, each item or container of radioactive material shall [835.605] bear a durable, clearly visible label bearing the standard radiation warning trefoil and the words "Caution, Radioactive Material" or "Danger, Radioactive Material."  Article 412.1 ( <b>excerpt</b> )  "The label shall [835.605] also provide sufficient information to permit individuals handling, using, or working in the vicinity of the items or containers to take precautions to avoid or control exposures."	This requirement is met through criteria established in the CHG posting and labeling program.
<b>74</b> Sec.835.606(a)  Exceptions to labeling requirements  Items and containers may be excepted from the radioactive material labeling requirements of § 835.605 when:  (1) Used, handled, or stored in areas posted and controlled in accordance with this subpart and sufficient information is provided to permit individuals to take precautions to avoid or control exposures; or  (2) The quantity of radioactive material is less than one tenth of the values specified in appendix E of this part; or  (3) Packaged, labeled, and marked in accordance with the regulations of the Department of Transportation or DOE Orders governing radioactive material transportation; or  (4) Inaccessible, or accessible only to individuals authorized to handle or use them, or to work in the vicinity; or  (5) Installed in manufacturing, process, or other equipment, such as reactor components, piping, and tanks; or  (6) The radioactive material consists solely of nuclear weapons or their components.	Article 411.2  "Except for sealed and unsealed sources, radioactive material located within Contamination, High Contamination or Airborne Radioactivity Areas does not require specific labeling, provided sufficient information is provided to permit individuals to take precautions to avoid or control exposures."  Article 412.2 ( <b>Modified</b> )  "Items and containers may be excepted from the radioactive material labeling requirements of Article 412.1 when:"  a. The quantity of radioactive material is less than one-tenth of the values specified in appendix 4A; or"  b. Packaged, labeled, and marked in accordance with the regulations of the Department of Transportation or DOE Orders governing radioactive material transportation; or"  c. Inaccessible, or accessible only to individuals authorized to handle or use them, or to work in the vicinity; or"  d. Installed in manufacturing, process, or other equipment, such as reactor components, piping, and tanks, or"  e. The radioactive material consists solely of nuclear weapons or their components."	This requirement is met through criteria established in the CHG posting and labeling program.  CHG does not anticipate possessing radioactive material consisting solely of nuclear weapons or their components. Should circumstances occur where this would be required, the requirements of § 835.606(a)(6) will be followed.

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<b>75</b> Sec. 835.606(b)  Radioactive material labels applied to sealed radioactive sources may be excepted from the color specifications of § 835.601(a).	Article 412.3 ( <b>excerpt</b> )  “Radioactive material labels applied to sealed radioactive sources may be excepted from these color specifications.”	
<b>Subpart H              Records</b>		
<b>76</b> Sec. 835.701(a)  General provisions.  Records shall be maintained to document compliance with this part and with radiation protection programs required by Sec. 835.101.	Article 711 ( <b>excerpt</b> )  “Radiological control records shall [835.701(a)] be maintained as necessary to document compliance with the requirements of 10 CFR 835 and with radiation protection programs required by § 835.101.”  Article 712.2  “Where radiological services (for example, dosimetry and laboratory analyses) are purchased, there should be a clear agreement regarding records responsibility during performance of the service. Records of results should reside in the custody of the originating contract organization.”  Article 722.1( <b>excerpt</b> )  “Records shall [835.702(a)] be maintained to document doses received by all individuals for whom monitoring was required by Articles 511 and 521 and to document doses received during planned special exposures, unplanned doses exceeding the monitoring thresholds of Articles 511 and 521, and authorized emergency exposures.”  Article 731.2 ( <b>excerpt</b> )  “Records of doses, including zero dose, received by all members of the public for whom monitoring was performed shall [835.702(a)] be maintained. These records shall [835.702(c)(1)] be sufficient to evaluate compliance with all applicable dose limits and monitoring and reporting requirements.”	Multiple required data may be contained in a single data record to allow for management of data, records, and reports.  CHG will maintain records required by this part in accordance with Occupational Radiation Protection Record -Keeping and Reporting Guide DOE G 441.1-11 dated 20 May 1999.
<b>77</b> Sec. 835.701(b)  Unless otherwise specified in this subpart, records shall be retained until final disposition is authorized by DOE.	Article 774.1 ( <b>excerpt and modified</b> )  “Unless otherwise specified in 10 CFR 835, records shall [835.701(b)] be retained until final disposition is authorized by DOE. All individual monitoring records required by Articles 721, 722, and 731.2, shall [835.702(h)] be transferred to DOE upon cessation of activities that could cause exposure to individuals.”	



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<b>78</b> Sec. 835.702(a)  Individual monitoring records.  Records shall be maintained to document doses received by all individuals for whom monitoring was required pursuant to Sec. 835.402 and to document doses received during planned special exposures, unplanned doses exceeding the monitoring thresholds of Sec. 835 .402, and authorized emergency exposures.	Article 722.1 ( <b>excerpt</b> )  “Records shall [835.702(a)] be maintained to document doses received by all individuals for whom monitoring was required by Articles 511 and 521 and to document doses received during planned special exposures, unplanned doses exceeding the monitoring thresholds of Articles 511 and 521, and authorized emergency exposures.”  Article 722.3 ( <b>excerpt</b> )  “Routine and special records related to radiation doses shall [835.702(a-b)] be retained for each person monitored. Procedures, data, and supporting information necessary for future verification or reassessment of the recorded doses shall [835.702(g); 835.704(e)] be recorded.”  Article 722.12 ( <b>excerpt</b> )  “Authorized emergency exposures and planned special exposures shall [835.1301(b)] be accounted for separately, but maintained with the individual’s occupational exposure records.”  Article 723.1 ( <b>excerpt</b> )  “The complete records of radiological incidents and occurrences involving personnel dose shall [835.1301(b)] be retained.”  Article 731.2 ( <b>excerpt</b> )  “Records of doses, including zero dose, received by all members of the public for whom monitoring was performed shall [835.702(a)] be maintained. These records shall [835.702(c)(1)] be sufficient to evaluate compliance with all applicable dose limits and monitoring and reporting requirements.”  Appendix 2A ( <b>modified and excerpted</b> )  “Emergency doses are in addition to and accounted for separately from the doses received under the limits in Table 2-1.”	

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<b>79</b> Sec. 835.702(b)  The results of individual external and internal dose monitoring that is performed, but not required by Sec. 835.402, shall be recorded. Recording of non-uniform shallow dose equivalent to the skin is not required if the dose is less than 2 percent of the limit specified for the skin at Sec. 835.202(a)(4).	Article 722.1 ( <b>excerpt</b> )  “Records shall [835.702(a)] be maintained to document doses received by all individuals for whom monitoring was required by Articles 511 and 521 and to document doses received during planned special exposures, unplanned doses exceeding the monitoring thresholds of Articles 511 and 521, and authorized emergency exposures. The results of individual external and internal dose monitoring that is performed, but not required by Articles 511 and 521, shall [835.702(b)] be recorded.”  Article 722.3 ( <b>excerpt</b> )  “Routine and special records related to radiation doses shall [835.702(a-b)] be retained for each person monitored. Procedures, data, and supporting information necessary for future verification or reassessment of the recorded doses shall [835.702(g); 835.704(e)] be recorded.”  Article 722.13 ( <b>excerpt</b> )  “Recording of the non-uniform shallow dose equivalent to the skin is not required if the dose is less than 2 percent of the limit specified for the skin at Table 2-1.”  Article 731.2 ( <b>excerpt</b> )  “Records of doses, including zero dose, received by all members of the public for whom monitoring was performed shall [835.702(a)] be maintained.”  Table 2-1 ( <b>excerpt</b> )  “Type of exposure – General Employee: skin and extremities : 50 rem”	
<b>80</b> Sec. 835.702(c)  The records required by this section shall:  (1) Be sufficient to evaluate compliance with subpart C of this part;  (2) Be sufficient to provide dose information necessary to complete reports required by subpart I of this part;  (3) Include the following quantities for external dose received during the year:	Article 711 ( <b>excerpt and modified</b> )  “Radiological control records shall [835.701(a)] be maintained as necessary to document compliance with the requirements of 10 CFR 835 subpart C.”  Article 722.2 ( <b>excerpt</b> )  “Individual monitoring records required by Article 722 shall [835.702(c)]: a. Be sufficient to evaluate compliance with	HNF-5183 TFRCM, Table 2-1 lists Types of Exposure and their associated exposure limits for CHG radiological activities.  CHG defines ‘reportable dose’ as those dose records as described in “Occupational Radiation Protection Record -Keeping and Reporting Guide, DOE G 441.1-11 of May 1999,

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<p>(i) The effective dose equivalent from external sources of radiation (deep dose equivalent may be used as effective dose equivalent for external exposure);</p> <p>(ii) The lens of the eye dose equivalent;</p> <p>(iii) The shallow dose equivalent to the skin; and</p> <p>(iv) The shallow dose equivalent to the extremities.</p> <p>(4) Include the following information for internal dose resulting from intakes received during the year:</p> <p>(i) Committed effective dose equivalent;</p> <p>(ii) Committed dose equivalent to any organ or tissue of concern; and</p> <p>(iii) Identity of radionuclides.</p> <p>(5) Include the following quantities for the summation of the external and internal dose:</p> <p>(i) Total effective dose equivalent in a year;</p> <p>(ii) For any organ or tissue assigned an internal dose during the year, the sum of the deep dose equivalent from external exposures and the committed dose equivalent to that organ or tissue; and</p> <p>(iii) Cumulative total effective dose equivalent</p> <p>(6) Include the dose equivalent to the embryo/fetus of a declared pregnant worker.</p>	<p>Articles 213, 214, and 215.”</p> <p>Article 722.1 (<b>excerpt</b>)</p> <p>“Documentation of all occupational doses received during the current year, except for doses resulting from planned special exposures conducted in compliance with Article 213.3 and emergency exposures authorized in accordance with Article 213.4, shall [835.702(d)] be obtained to demonstrate compliance with dose limits in Table 2-1.”</p> <p>Article 722.2 (<b>excerpt and modified</b>)</p> <p>“Individual monitoring records required by Article 722 shall [835.702(c)]: b. Be sufficient to provide dose information necessary to complete reports required by Article 781.”</p> <p>Article 722.3 (<b>excerpt</b>)</p> <p>“Routine and special records related to radiation doses shall [835.702(a-b)] be retained for each person monitored. Procedures, data, and supporting information necessary for future verification or reassessment of the recorded doses shall [835.702(g); 835.704(e)] be recorded.”</p> <p>Article 722.6</p> <p>“Records of the summation of external dose and committed dose equivalent to any organ receiving a reportable dose shall [835.702(c)(5)] be maintained for the individual receiving such dose.”</p> <p>Article 722.7 (<b>excerpt</b>)</p> <p>“Include the following quantities for the summation of the external and internal dose:</p> <p>a. Total effective dose equivalent in a year;</p> <p>b. For any organ or tissue assigned an internal dose during the year, the sum of the deep dose equivalent from external exposures and the committed dose equivalent to that organ or tissue; and</p> <p>c. Cumulative total effective dose equivalent.”</p> <p>Article 722.8 (<b>excerpt</b>)</p> <p>“The dose equivalent to the embryo/fetus of a declared pregnant</p>	<p>Section 4.1.</p> <p>TFRCM, Table 2-1 lists Types of exposure and associated exposure limits for CHG radiological activities.</p>

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	<p>worker shall [835.702(c)(6)] be maintained with the occupational exposure records for that worker.”</p> <p>Article 722.9 (excerpt)</p> <p>“Records of lifetime occupational dose, including cumulative total effective dose equivalent since January 1, 1989, shall [835.702(c)(5)] be maintained with the individual’s occupational exposure records.”</p> <p>Article 722.12</p> <p>“Authorized emergency exposures and planned special exposures shall [835.1301(b)] be accounted for separately, but maintained with the individual’s occupational exposure records.”</p> <p>Article 723.1</p> <p>“The complete records of radiological incidents and occurrences involving personnel dose shall [835.1301(b)] be retained.”</p> <p>Article 731.2</p> <p>“Records of doses including zero dose received by all members of the public for whom monitoring was performed shall [835.702(a)] be maintained. These records shall [835.702(c)(1)] be sufficient to evaluate compliance with all applicable dose limits and monitoring and reporting requirements.”</p> <p>Article 722.4 (excerpt)</p> <p>“External dose records shall [835.702(b)] include the following:</p> <ul style="list-style-type: none"> <li>a. Applicable extremity, skin, eye and whole body dose results measured with personnel dosimeters, including all multiple dosimeter badging results and area monitoring records</li> <li>b. Evaluations resulting from anomalous dose results such as unexpected high or low doses.</li> <li>d. Evaluations of nonuniform radiation doses.</li> <li>e. Quantities for external dose received during the year:</li> </ul> <p style="padding-left: 40px;">The effective dose equivalent from external sources of radiation (deep dose equivalent may be used as effective dose equivalent for external exposure)”</p>	

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	<p>Article 512.4 (<b>excerpt</b>)</p> <p>“Personnel exposures to the lens of the eye shall [835.702(c)(3)] be reported separately when monitored.”</p> <p>Article 722.4.e (<b>excerpt</b>)</p> <p>“External dose records shall [835.702(b)] include the following: Quantities for external dose received during the year:</p> <p style="padding-left: 40px;">(5) The lens of the eye dose equivalent.”</p> <p>Article 512.4 (<b>excerpt</b>)</p> <p>“Personnel exposures to the skin shall [835.702(c)(3)] be reported separately when monitored.”</p> <p>Article 722.4.e (<b>excerpt</b>)</p> <p>“External dose records shall [835.702(b)] include the following: Quantities for external dose received during the year:</p> <p style="padding-left: 40px;">(6) The shallow dose equivalent to the skin”</p> <p>Article 512.4 (<b>excerpt</b>)</p> <p>“Personnel exposures to the extremities shall [835.702(c)(3)] be reported separately when monitored.”</p> <p>Article 722.4.e (<b>excerpt</b>)</p> <p>“External dose records shall [835.702(b)] include the following: Quantities for external dose received during the year:</p> <p style="padding-left: 40px;">(7) The shallow dose equivalent to the extremities.”</p> <p>Chapter 2, Part 1 (<b>excerpt</b>)</p> <p>“The committed effective dose equivalent is used to assign internal dose received by personnel at DOE facilities. The committed effective dose equivalent is the resulting dose committed to the whole body from internally deposited radionuclides over a 50-year period after intake.”</p> <p>Table 2-1 Note 1</p> <p>“Internal dose to the whole body shall [835.203(a)] be calculated as committed effective dose equivalent. The committed effective dose equivalent is the resulting dose committed to the whole body</p>	

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	<p>from internally deposited radionuclides over a 50-year period after intake. Determinations of the effective dose equivalent shall [835.203(b)] be made using the weighting factor values provided in Appendix 2B.”</p> <p>Appendix 2B</p> <p>Weighting Factors for Organs and Tissues</p> <p>Article 722.5 (<b>excerpt</b>)</p> <p>“Internal dose records shall [835.702(b)] include the following:</p> <p>a. Results of monitoring used to determine individual occupational dose from internal sources shall [835.703(b)] be documented and maintained.</p> <p>b. Applicable whole body and lung counting results (including chest wall thickness measurements where applicable).</p> <p>c. Applicable urine, fecal and specimen analysis results, including estimated intake and identity of radionuclides.</p> <p>e. Information for internal dose resulting from intakes received during the year:</p> <p style="padding-left: 40px;">(8) Committed effective dose equivalent.”</p> <p>Table 2-1 Note 2:</p> <p>“The annual limit of exposure to “any organ or tissue” is based on the committed dose to that organ or tissue resulting from internally deposited radionuclides over a 50-year period after intake plus any deep dose equivalent to that organ during the year.”</p> <p>Article 722.5 (<b>excerpt</b>)</p> <p>“Internal dose records shall [835.702(b)] include the following:</p> <p>a. Results of monitoring used to determine individual occupational dose from internal sources shall [835.703(b)] be documented and maintained.</p> <p>b. Applicable whole body and lung counting results (including chest wall thickness measurements where applicable).</p> <p>c. Applicable urine, fecal and specimen analysis results, including estimated intake and identity of radionuclides.</p>	

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	<p>e. Information for internal dose resulting from intakes received during the year:</p> <p style="padding-left: 40px;">* Committed dose equivalent to any organ or tissue of concern.”</p> <p>Article 722.6 (<b>excerpt</b>)</p> <p>“Records of the summation of external dose and committed dose equivalent to any organ receiving a reportable dose shall [835.702(c)(5)] be maintained for the individual receiving such dose.”</p> <p>Article 523.1-6 (<b>excerpt</b>)</p> <p>“Interpretations of bioassay results and subsequent dose assessments should include the following:</p> <p>1. Characteristics of the radionuclide, such as chemical and physical form.”</p> <p>Article 722.5.c (<b>excerpt</b>)</p> <p>“Internal dose records shall [835.702(b)] include the following:</p> <p>c. Applicable urine, fecal and specimen analysis results, including estimated intake and identity of radionuclides.</p> <p>e. Information for internal dose resulting from intakes received during the year:</p> <p style="padding-left: 40px;">(9) Identity of radionuclides.”</p> <p>Article 722.7.a (<b>excerpt</b>)</p> <p>“Include the following quantities for the summation of the external and internal dose:</p> <p>a. Total effective dose equivalent in a year;”</p> <p>Table 2-1: Note 2</p> <p>“The annual limit of exposure to “any organ or tissue” is based on the committed dose to that organ or tissue resulting from internally deposited radionuclides over a 50-year period after intake plus any deep dose equivalent to that organ during the year.”</p> <p>Article 722.6 (<b>excerpt</b>)</p>	

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	<p>“Records of the summation of external dose and committed dose equivalent to any organ receiving a reportable dose shall [835.702(c)(5)] be maintained for the individual receiving such dose.”</p> <p>Article 722.7.b (<b>excerpt</b>)</p> <p>“Include the following quantities for the summation of the external and internal dose:</p> <p>b. For any organ or tissue assigned an internal dose during the year, the sum of the deep dose equivalent from external exposures and the committed dose equivalent to that organ or tissue.”</p> <p>Article 212.2</p> <p>“Cumulative total effective dose equivalent shall [835.702(c)(5)(iii)] be recorded for all exposures received since January 1, 1989.”</p> <p>Article 722.7.c (<b>excerpt</b>)</p> <p>“7. Include the following quantities for the summation of the external and internal dose:</p> <p>c. Cumulative total effective dose equivalent.”</p> <p>Article 722.9 (<b>excerpt</b>)</p> <p>“Records of lifetime occupational dose, including cumulative total effective dose equivalent since January 1, 1989, shall [835.702(c)(5)] be maintained with the individual’s occupational exposure records.”</p> <p>Table 2-1</p> <p>Summary of Dose Limits</p> <p>“Declared Pregnant Worker: Embryo/Fetus.”</p> <p>Article 722.8 (<b>excerpt</b>)</p> <p>“The dose equivalent to the embryo/fetus of a declared pregnant worker shall [835.702(c)(6)] be maintained with the occupational exposure records for that worker.”</p>	



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<b>81</b> Sec. 835.702(d)  Documentation of all occupational doses received during the current year, except for doses resulting from planned special exposures conducted in compliance with § 835.204 and emergency exposures authorized in accordance with § 835.1302(d), shall be obtained to demonstrate compliance with Sec. 835.202(a). If complete records documenting previous occupational dose during the year cannot be obtained, a written estimate signed by the individual may be accepted to demonstrate compliance.	Article 213.1 ( <b>excerpt</b> )  “All occupational doses received during the current year, except doses resulting from planned special exposures conducted in compliance with Article 213.3 and emergency exposures authorized in accordance with Article 213.4, shall [835.202(b)] be included when demonstrating compliance with Table 2-1, occupational dose limits for general employees and minors.”  Article 722.1 ( <b>excerpt and modified</b> )  “Documentation of all occupational doses received during the current year, except for doses resulting from planned special exposures conducted in compliance with Article 213.3 and emergency exposures authorized in accordance with Article 213.4, shall [835.702(d)] be obtained to demonstrate compliance with dose limits in Table 2-1, for general employees. If complete records documenting previous occupational dose during the year cannot be obtained, a written estimate signed by the individual may be accepted to demonstrate compliance [835.702(d)].”  Article 213.2.c ( <b>excerpt and modified</b> )  “Radiological workers from other facilities may receive occupational exposure as a radiological worker if they:  c. Provide their radiation dose records for previous years and written estimates, signed by the individual, for the current year.”  Article 722.1 ( <b>excerpt</b> )  “If complete records documenting previous occupational dose during the year cannot be obtained, a written estimate signed by the individual may be accepted to demonstrate compliance [835.702(d)].”	
<b>82</b> Sec. 835.702(e)  For radiological workers whose occupational dose is monitored in accordance with § 835.402, reasonable efforts shall be made to obtain complete records of prior years occupational internal and external doses.	Article 213.2.c  “Radiological workers from other DOE or DOE contractor facilities may receive occupational exposure as a radiological worker if they:  c. Provide their radiation dose records for previous years and written estimates, signed by the individual, for the current year.”  Article 721.1 ( <b>excerpt</b> )	“Reasonable efforts shall be made” means at least 3 attempts to obtain exposure information as recommended by Occupational Protection Record -Keeping and Reporting Guide, DOE G 441.1-11, Section 4.1.1.4 of May 1999.

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	“For radiological workers whose occupational dose is monitored in accordance with Articles 511 and 521, reasonable efforts shall [835.702(e)] be made to obtain complete records of prior years occupational internal and external doses.”	
<b>83</b> Sec. 835.702(f)  The records specified in this section that are identified with a specific individual shall be readily available to that individual.	Article 781.4 ( <b>excerpt</b> )  “The records specified in Articles 721 and 722 that are identified with a specific individual shall [835.702(f)] be readily available to that individual.”  Article 722.2 ( <b>excerpt and modified</b> )  “Radiation dose records shall [835.702(c)] contain information sufficient to identify each person, including social security, employee number, or other unique identification number.”	
<b>84</b> Sec. 835.702(g)  Data necessary to allow future verification or reassessment of the recorded doses shall be recorded.	Article 722.3  “Routine and special records related to radiation doses shall [835.702(a-b)] be retained for each person monitored. Procedures, data, and supporting information necessary for future verification or reassessment of the recorded doses shall [835.702(g); 835.704(e)] be recorded.”	
<b>85</b> Sec. 835.702(h)  All records required by this section shall be transferred to the DOE upon cessation of activities at the site that could cause exposure to individuals.	Article 774.1 ( <b>excerpt</b> )  “All individual monitoring records required by Articles 721, 722, and 731.2, shall [835.702(h)] be transferred to DOE upon cessation of activities that could cause exposure to individuals.”	
<b>86</b> Sec. 835.703(a)  <i>The following information shall be documented and maintained:</i>  Results of monitoring for radiation and radioactive material as required by subparts E and L of this part, except for monitoring required by Sec. 835.1102(d).	Article 751.1 ( <b>excerpt</b> )  Results of monitoring for radiation and radioactive material as required by Articles 421 and 423, and Chapter 5, Part 5, shall [835.703(a)] be documented and maintained.  Article 752.1 ( <b>excerpt</b> )  “In addition to the elements provided in Article 751, records of radiation surveys shall [835.401(a); 835.703] include, at a minimum, the following information:  a. Instrument model and serial number  b. Results of the measurements of area dose rates”	

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	<p>Article 753.1 (excerpt)</p> <p>“In addition to the elements provided in Article 751, records of airborne radioactivity shall [835.401(a); 835.703] include, at a minimum, the following information:</p> <ul style="list-style-type: none"> <li>a. Model and serial numbers of the sampler and laboratory counting instrument when available or unique identifier of each sampler and instrument.</li> <li>b. Location of fixed air samplers</li> <li>c. Location of portable air samplers used for a survey</li> <li>d. Air concentrations in general airborne areas and breathing zones</li> <li>e. Supporting parameters, including collection efficiency, flow rate, duration of sampling, correction factors and filter medium.” <p>Article 754.1 (excerpt)</p> <p>“In addition to the elements required by Article 751, records of contamination surveys shall [835.401(a); 835.703] include, at a minimum, the following information:</p> <ul style="list-style-type: none"> <li>a. Model and serial number of counting equipment.</li> <li>b. Contamination levels (using appropriate units) and appropriate supporting parameters including counting efficiency, counting time, correction factors, type of radiation and whether the contamination was fixed or removable.</li> <li>c. Location of areas found to contain hot particles or high concentrations of localized contamination</li> <li>d. Follow-up survey results for decontamination processes cross-referenced to the original survey.” </li></ul></li></ul>	
<p><b>87</b>                      Sec. 835.703(b)</p> <p>Results of monitoring used to determine individual occupational dose from external and internal sources;</p>	<p>Article 712.1</p> <p>“i. Area Monitoring Dosimetry Results (used for dose reconstruction).”</p> <p>Article 722.4</p> <p>“External dose records shall [835.702(b)] include the following:</p>	

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	<p>a. Results of monitoring used to determine individual occupational dose from external sources shall [835.703(b)] be documented and maintained. Applicable extremity, skin, eye and whole body dose results measured with personnel dosimeters, including all multiple dosimeter badging results and area monitoring records</p> <p>b. Evaluations resulting from anomalous dose results such as unexpected high or low doses</p> <p>c. Dose reconstructions from lost or damaged dosimeters, or for unbadged workers</p> <p>d. Evaluations of nonuniform radiation doses.”</p> <p>Article 722.5 (<b>excerpt</b>)</p> <p>“Internal dose records shall [835.702(b)] include the following:</p> <p>a. Results of monitoring used to determine individual occupational dose from internal sources shall [835.703(b)] be documented and maintained.</p> <p>b. Applicable whole body and lung counting results (including chest wall thickness measurements where applicable)</p> <p>c. Applicable urine, fecal and specimen analysis results, including estimated intake and identity of radionuclides</p> <p>d. Dose assessment, as required.”</p> <p>Article 752.1.b (<b>excerpt and modified</b>)</p> <p>“Records of radiation surveys should include:</p> <p>b. Results of the measurements of area dose rates.”</p> <p>Article 753.1.d &amp; e (<b>excerpt</b>)</p> <p>“Records of airborne radioactivity should include:</p> <p>d. Air concentrations in general airborne areas and breathing zones</p> <p>e. Supporting parameters, including collection efficiency, flow rate, duration of sampling, correction factors and filter medium.”</p>	

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<b>88</b> Sec. 835.703(c)  Results of monitoring for the release and control of material and equipment as required by Sec. 835.1101; and	Article 421.5  “The results of monitoring for the release and control of material and equipment shall [835.703(c)] be documented and maintained.”	
<b>89</b> Sec. 835.703(d)  Results of maintenance and calibration performed on instruments and equipment as required by Sec. 835.401(b).	Article 564.1.d ( <b>excerpt and modified</b> )  “Calibration facilities should take the following actions:  d. Generate records of calibration, functional tests and maintenance.”  Article 761.1, 2, 3, 4 ( <b>1 is modified, 2 is an excerpt</b> )  1. “Results of calibrations performed on instruments and equipment used for monitoring individuals, materials, and areas as required by 10 CFR 835 shall [835.703(d)] be documented and maintained and should include frequencies, method, dates, personnel, training and traceability of calibration sources to National Institute of Science and Technology or other acceptable standards.  2. Calibration records should be maintained for the following equipment:  a. Portable survey instruments b. Bioassay measurement equipment c. Laboratory, counting room and fixed radiation measuring equipment d. Process and effluent monitors and sampling equipment e. Radiation area monitors f. Portal monitors and other personnel contamination monitors g. Pocket and electronic dosimeters h. Air sampling equipment i. Tool and waste monitoring equipment j. Protective clothing and equipment monitors k. Dosimetry Processing Instrumentation l. Other devices used in radiation detection or measurement, as	

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	<p>applicable.</p> <p>3. Documentation of instrument operational checks shall [835.703(d)] be maintained for a period not less than the calibration period of the instrument or equipment</p> <p>4. Maintenance histories, including the nature of any defects and corrective actions taken, and calibration results for each instrument or equipment shall [835.703(d)] be created and retained.”</p> <p>Article 762 (<b>excerpt</b>)</p> <p>“Records of additional tests and checks of instrumentation or equipment used in conjunction with a suspected overexposure, questionable indication or unusual occurrence should be retained. In addition, records of special instrument calibrations and modifications made in accordance with Article 562.6 shall [835.703(d)] be retained.”</p>	
<p><b>90</b>                    Sec. 835.704(a)</p> <p>Administrative records.</p> <p>Training records shall be maintained, as necessary, to demonstrate compliance with Sec. 835.901.</p>	<p>Article 612.3 (<b>excerpt</b>)</p> <p>“Documentation of previous training should include the individual’s name, date of training, topics covered, and name of the certifying official.”</p> <p>Article 725.1, 3, 4, 5, 6 (<b>3-6 are excerpts, 725.3.e is modified</b>)</p> <p>1. “Records of training and qualification in radiological control shall [835.704(a)] be maintained to demonstrate that a person received appropriate information to perform the work assignment in a safe manner. Qualification standard records shall [835.704(a)] be retained for on-the-job and practical factor training as well as for formal classroom training.</p> <p>3. Personnel training records shall [835.704(a)] be controlled and retained. At a minimum, these records shall [DOE 5480.20A, Ch. 1, Section 15 (a)] include the following:</p> <ul style="list-style-type: none"> <li>a. Course title</li> <li>b. Attendance sheets with instructor’s name</li> <li>c. Employee’s name, identification number, and signature</li> <li>d. Date of training</li> </ul>	

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	<p>e. Identification of the examination or examination form, including sufficient data to identify which test each person completed</p> <p>f. Verification document or record confirming satisfaction of the training requirement</p> <p>g. Documentation related to exceptions for training requirements and extensions of qualification</p> <p>h. Quizzes, tests, responses and acknowledgements of training, with the date and signature of the person trained</p> <p>i. Special instructions to individuals concerning prenatal radiation dose, acknowledged by the individual's signature.”</p> <p>4. Records shall [835.704(a)] be retained for the following types of radiation safety training.</p> <ul style="list-style-type: none"> <li>• General employee radiological training</li> <li>• Radiological worker training</li> <li>• Periodic retraining</li> <li>• Training of radiological control technicians</li> <li>• Members of the public training</li> </ul> <p>“Records shall [835.704(a)] be retained for the following types of radiation safety training:</p> <ul style="list-style-type: none"> <li>• Instructor training</li> <li>• Training of other radiological control personnel</li> <li>• Respiratory protection training</li> <li>• Qualifications for special tests or operations</li> <li>• Training of emergency response personnel</li> <li>• Training of RGD operators.</li> <li>• Onsite training of radiographers</li> </ul> <p>5. The following instructional material should be maintained:</p> <p>a. Course name, with revision and approval date</p>	

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	<p>b. Instructor's manuals, course content, or lesson plans containing topical outlines.</p> <p>c. Video and audio instructional materials including the dates and lessons for which they were used.</p> <p>d. Handouts or other materials retained with the master copy of the course</p> <p>e. Job-specific training documents, such as instrument use, radiological procedures, Radiological Work Permit special training requirements, pre -job briefings and mock-up training.</p> <p>6. Documentation of training and qualification received at another DOE location need not be duplicated."</p>	
<p><b>91</b>                      Sec. 835.704(b)</p> <p>Actions taken to maintain occupational exposures as low as reasonably achievable, including the actions required for this purpose by Sec. 835.101, as well as facility design and control actions required by Secs. 835.1001, 835.1002, and 835.1003, shall be documented.</p>	<p>Article 742 (<b>excerpt</b>)</p> <p>"Actions taken to maintain occupational exposures as low as reasonably achievable, including actions required for this purpose in the radiation protection program (RPP), as well as facility design and control actions required by Articles 128 and 311, shall [835.704(b)] be documented."</p>	<p>"Actions taken to maintain..." means the seven essential elements of an occupational ALARA program, as specified in the Implementation Guide, "Occupational ALARA Program Guide", DOE G 441.1-2, Rev.1, March 17, 1999.</p>
<p><b>92</b>                      Sec. 835.704(c)</p> <p>Records shall be maintained to document the results of internal audits and other reviews of program content and implementation.</p>	<p>Article 743 (<b>excerpt</b>)</p> <p>"Records shall [835.704(c)] be maintained to document the results of internal audits and other reviews of radiation protection program content and implementation."</p>	
<p><b>93</b>                      Sec. 835.704(d)</p> <p>Written declarations of pregnancy, including the estimated date of conception and revocations of declarations of pregnancy, shall be maintained.</p>	<p>Article 215 (modified)</p> <p>"After a female worker voluntarily notifies her employer in writing that she is pregnant, for the purposes of fetal/embryo dose protection, she is considered a declared pregnant worker. This declaration may be revoked, in writing, at any time by the declared pregnant worker."</p> <p>Article 723.3 (<b>excerpt</b>)</p> <p>"Written declarations of pregnancy, including the estimated date of conception, and revocations of declarations of pregnancy shall [835.704(d)] be maintained."</p>	



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<b>94</b> Sec. 835.704(e)  Changes in equipment, techniques, and procedures used for monitoring shall be documented.	Article 751.2  “Changes in equipment, techniques, and procedures used for monitoring shall [835.704(e)] be documented.”	Note: For the purposes of this RPP, documented changes are limited to those changes to sampling and monitoring systems directly related to occupational radiation protection (for example, area monitoring and air sampling) and not process monitoring.
<b>95</b> Sec. 835.704(f)  Records shall be maintained as necessary to demonstrate compliance with the requirements of §§ 835.1201 and 835.1202 for sealed radioactive source control, inventory, and source leak tests.	Article 755.1 ( <b>excerpt</b> ) “Records shall [835.704(f)] be maintained as necessary to demonstrate compliance with the requirements of Article 431 for sealed radioactive source control, inventory, and source leak tests.”  Article 755.2 “In addition to the elements provided in Article 751, records of sealed radioactive source leak tests shall [835.704(e); 835.1202] include, at a minimum, the following information: a.    Model and serial number of counting equipment b.    Contamination levels (using appropriate units) and appropriate supporting parameters including counting efficiency, counting time, correction factors, and type of radiation c.    Corrective actions for leaking sources.”  Article 755.3 “Records of sealed radioactive source inventories shall [835.704(f); 835.1202] include, at a minimum, the following information: a.    The physical location of each accountable sealed radioactive source b.    Verification of the presence and adequacy of associated postings and labels c.    Verification of the adequacy of storage locations, containers, and devices.”	

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<b>Subpart I       Reports to Individuals</b>			
<b>96</b>	Sec. 835.801(a)	<p>Article 781.1 (<b>excerpt</b>)</p> <p>“Radiation exposure data for individuals monitored in accordance with Articles 511 and 521 shall [835.801(a)] be reported as specified in this section.”</p> <p>Article 781.1 (<b>excerpt and modified</b>)</p> <p>“The information shall [835.801(a)] include the data required under Article 722.2, 722.4.e, 722.5.e, 722.7 and 722.8.”</p> <p>Article 781.1 (<b>modified and excerpted</b>)</p> <p>“Each notification and report shall [835.801(a)] be in writing and include: the DOE site or facility name, the name of the individual, and the individual’s social security number, employee number, or other unique identification number.”</p>	CHG implements the requirements of section § 835.801 through the CHG dosimetry program and through subcontracted services.
<b>97</b>	Sec. 835.801(b)	<p>Article 781.2 (<b>excerpt</b>)</p> <p>“Upon the request from an individual terminating employment, records of exposure shall [835.801(b)] be provided to that individual as soon as the data are available, but not later than 90 days after termination.”</p> <p>Article 732 (<b>excerpt</b>)</p> <p>“The termination dose report shall [10 CFR 835.801(b)] be provided to the requesting individual as soon as data are available, but not later than 90 days after termination. A written estimate of the radiation dose received by the individual based on available information shall [10 CFR 835.801(b)] be provided at the time of termination, if requested.”</p> <p>Article 781.2 (<b>excerpt and modified</b>)</p> <p>“A written estimate, based upon available information, shall be provided upon termination, if requested.”</p>	

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<b>98</b> Sec. 835.801(c)  Each DOE- or DOE-contractor-operated site or facility shall, on an annual basis, provide a radiation dose report to each individual monitored during the year at that site or facility in accordance with Sec. 835.402.	Article 781.3  “Each DOE- or DOE-contractor-operated site or facility shall [835.801(c)], on an annual basis, provide a radiation dose report to each individual monitored during the year at that site or facility in accordance with Articles 511 and 521.”	
<b>99</b> Sec. 835.801(d)  Detailed information concerning any individual’s exposure shall be made available to the individual upon request of that individual, consistent with the provisions of the Privacy Act (5 USC 552a).	Article 781.4 ( <b>excerpt</b> )  “Detailed information concerning any individual’s exposure shall [835.801(d)] be made available to the individual upon request of that individual, consistent with the provisions of the Privacy Act (5 USC 552a).”	
<b>100</b> Sec. 835.801(e)  When a DOE contractor is required to report to the Department, pursuant to Departmental requirements for occurrence reporting and processing, any exposure of an individual to radiation and/or radioactive material, or planned special exposure in accordance with Sec. 835.204(e), the contractor shall also provide that individual with a report on his or her exposure data included therein. Such report shall be transmitted at a time not later than the transmittal to the Department.	Article 781.5 ( <b>excerpt</b> )  “When a DOE contractor is required to report to the Department, pursuant to Department requirements for occurrence reporting and processing, any exposure of an individual to radiation and/or radioactive material, or planned special exposure in accordance with Article 213.3, the contractor shall [835.801(e)] also provide that individual with a report on his or her exposure data included therein.”  Article 781.5 ( <b>excerpt</b> )  “Such report shall [835.801(e)] be transmitted at a time not later than the transmittal to the Department.”	“Departmental requirements” means DOE Order DOE O 232.1-1A, 21 July 1997.
<b>Subpart J                      Radiation Safety Training</b>		
<b>101</b> Sec. 835.901(a)  Radiation safety training  Each individual shall complete radiation safety training on the topics established at § 835.901(c) commensurate with the hazards in the area and the required controls:  (1) Before being permitted unescorted access to controlled areas; and  (2) Before receiving occupational dose during access to controlled areas at a DOE site or facility.	Article 613.3 ( <b>Modified</b> )  “General Employee Radiological Training:  Each individual shall [835.901(a)] complete radiation safety training on the topics established in Article 613.1 commensurate with the hazards in the area and the required controls:  a. Before being permitted unescorted access to controlled areas; and  b. Before receiving occupational dose during access to controlled areas at a DOE site or facility.”	CHG implements the requirements of § 835.901 through the WTP training program and through subcontracted services.  Note: General Employee Radiological Training (GERT) is used to satisfy this 10 CFR 835 requirement.  Clarification: Radiological Worker Training satisfies the requirements for GERT.

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	<p>Article 622.1 (excerpt)</p> <p>“Members of the public shall [835.901(a)] receive radiation safety training prior to being permitted unescorted access to Radiologically Controlled Areas. This training shall [835.901(c)] address the radiation safety training topics in Article 613.1 to the extent appropriate for the degree of exposure to radiological hazards that may be encountered.”</p>	<p>CHG will apply the graded approach in the implementation of CHG Radiation Protection Program procedures for this functional area. Note the application of § 835.901(c) graded approach applies to requirements 101 through 103.</p>
<p><b>102</b>                      Sec. 835.901(b)</p> <p>Each individual shall demonstrate knowledge of the radiation safety training topics established at § 835.901(c), commensurate with the hazards in the area and required controls, by successful completion of an examination and performance demonstrations:</p> <ul style="list-style-type: none"> <li>(1) Before being permitted unescorted access to radiological areas; and</li> <li>(2) Before performing unescorted assignments as a radiological worker.</li> </ul>	<p>Article 613.4</p> <p>“Each individual shall demonstrate knowledge of the radiation safety training topics established in Article 613.1, commensurate with the hazards in the area and required controls, by successful completion of an examination and performance demonstrations:</p> <ul style="list-style-type: none"> <li>a. Before being permitted unescorted access to radiological areas; and</li> <li>b. Before performing unescorted assignments as a radiological worker.”</li> </ul>	<p>Clarification: CHG applies a two tier training approach to individual or position training. Common skills and knowledge are provided at a site-wide level and additional training is provided at the facility level to address facility or process specific skills or knowledge attributes.</p>
<p><b>103</b>                      Sec. 835.901(c)</p> <p>Radiation safety training shall include the following topics, to the extent appropriate to each individual’s prior training, work assignments, and degree of exposure to potential radiological hazards:</p> <ul style="list-style-type: none"> <li>(1) Risks of exposure to radiation and radioactive materials, including prenatal radiation exposure;</li> <li>(2) Basic radiological fundamentals and radiation protection concepts;</li> <li>(3) Physical design features, administrative controls, limits, policies, procedures, alarms, and other measures implemented at the facility to manage doses and maintain doses ALARA, including both routine and emergency actions;</li> <li>(4) Individual rights and responsibilities as related to implementation of the facility radiation protection program;</li> <li>(5) Individual responsibilities for implementing ALARA measures required by § 835.101; and</li> </ul>	<p>Article 613.1 (excerpt)</p> <p>“Radiation safety training shall [835.901(c)] include the following topics, to the extent appropriate to each individual’s prior training, work assignments, and degree of exposure to potential radiological hazards:</p> <ul style="list-style-type: none"> <li>a. Risks of exposure to radiation and radioactive materials, including prenatal radiation exposure;”</li> <li>b. Basic radiological fundamentals and radiation protection concepts;”</li> <li>c. Physical design features, administrative controls, limits, policies, procedures, alarms, and other measures implemented at the facility to manage doses and maintain doses ALARA, including both routine and emergency actions;”</li> <li>d. Individual rights and responsibilities as related to implementation of the facility radiation protection program;”</li> <li>e. Individual responsibilities for implementing ALARA measures; and”</li> </ul>	

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(6) Individual exposure reports that may be requested in accordance with § 835.801.	f. Individual exposure reports that may be requested in accordance with Article 712.4.”	
<b>104</b> Sec. 835.901(d)  When an escort is used in lieu of training in accordance with paragraph (a) or (b) of this section, the escort shall: <ul style="list-style-type: none"> <li>(1) Have completed radiation safety training, examinations, and performance demonstrations required for entry to the area and performance of the work; and</li> <li>(2) Ensure that all escorted individuals comply with the documented radiation protection program.</li> </ul>	Article 635 ( <b>excerpt</b> )  “When an escort is used in lieu of training in accordance with Article 613.12 and 613.13, the escort shall [835.901(d)]: <ul style="list-style-type: none"> <li>a. Have completed radiation safety training, examinations, and performance demonstrations required for entry to the area and performance of the work; and”</li> <li>b. Ensure that all escorted individuals comply with the documented radiation protection program.”</li> </ul>	
<b>105</b> Sec. 835.901(e)  Radiation safety training shall be provided to individuals when there is a significant change to radiation protection policies and procedures that may affect the individual and at intervals not to exceed 24 months. Such training provided for individuals subject to the requirements of § 835.901(b)(1) and (b)(2) shall include successful completion of an examination.	Article 613.3 ( <b>excerpt</b> )  Changes to the program shall [835.901(e)] be incorporated as they are identified and a decision made if retraining prior to the 24 month period is needed.  Article 613.4 ( <b>excerpt</b> )  “Radiation safety training shall [835.901(e)] be provided to individuals when there is a significant change to radiation protection policies and procedures that may affect the individual.”  Article 613.4 ( <b>excerpt and modified</b> )  “Radiation safety training shall be provided to individuals at intervals not to exceed 24 months.”  Article 613.4( <b>excerpt</b> )  “Such training provided for individuals subject to the requirements of this Article shall [835.901(e)] include successful completion of an examination.”	CHG will apply the graded approach in the implementation of CHG Radiation Protection Program procedures for this functional area

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<b>Subpart K      Design and Control</b>			
<b>106</b>	Sec. 835.1001(a) Design and control.  Measures shall be taken to maintain radiation exposure in controlled areas ALARA through physical design features and administrative control.  The primary methods used shall be physical design features (e.g., confinement, ventilation, remote handling, and shielding).  Administrative controls shall be employed only as supplemental methods to control radiation exposure.	Article 311 ( <b>excerpt</b> )  “During routine operations, the combination of physical design features and administrative control shall [835.1003(a-b)] provide that: 1) the anticipated occupational dose to general employees shall [835.1003(a)] not exceed the limits established in Table 2-1, and 2) the ALARA process is utilized for personnel exposures to ionizing radiation.”  Article 311 ( <b>excerpt</b> )  “The primary methods used to maintain exposures ALARA shall [835.1001(a)] be physical design features (e.g., confinement, ventilation, remote handling, and shielding).”  Article 311 ( <b>modified</b> )  “Administrative controls shall [835.1001(a)] be employed only as supplemental methods to control radiation exposure.”	The plans and measures for complying with 10 CFR 835 design and control requirements are described in PL-W375-NS00005, <i>RPP-WTP ALARA Program</i> .
<b>107</b>	Sec. 835.1001(b)  For specific activities where use of physical design features is demonstrated to be impractical, administrative controls shall be used to maintain radiation exposures ALARA.	Article 316.2  “The minimization and control of internal exposure as discussed in Article 136 should be conducted in accordance with the following hierarchy of controls:  2. For specific activities where use of physical design features is demonstrated to be impractical, administrative controls shall [835.1001(b)] be used to maintain radiation exposures ALARA.”	
	Sec. 835.1002 Facility design and modifications  During the design of new facilities or modification of existing facilities, the following objectives shall be adopted:		
<b>108</b>	Sec. 835.1002(a)  Optimization methods shall be used to assure that occupational exposure is maintained ALARA in developing and justifying facility design and physical controls.	Article 128.1.a ( <b>excerpt</b> )  “Optimization methods shall [835.1002(a)] be used to assure that occupational exposure is maintained ALARA in developing and justifying facility design and physical controls.”	

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<p><b>109</b>                      Sec. 835.1002(b)</p> <p>The design objective for controlling personnel exposure from external sources of radiation in areas of continuous occupational occupancy (2000 hours per year) shall be to maintain exposure levels below an average of 0.5 mrem (5 microsieverts) per hour and as far below this average as is reasonably achievable. The design objectives for exposure rates for potential exposure to a radiological worker where occupancy differs from the above shall be ALARA and shall not exceed 20 percent of the applicable standards in Sec. 835.202.</p>	<p>Article 128.1.a (<b>excerpt</b>)</p> <p>“Optimization methods shall [835.1002(a)] be used to assure that occupational exposure is maintained ALARA in developing and justifying facility design and physical controls.”</p> <p>Article 128.1.b (<b>excerpt</b>)</p> <p>“The design objective for controlling personnel exposure from external sources of radiation in areas of continuous occupational occupancy (2000 hours per year) shall [835.1002(b)] be to maintain exposure levels below an average of 0.5 mrem (5 microsieverts) per hour and as far below this average as is reasonably achievable.”</p> <p>Article 128.2 (<b>excerpt</b>)</p> <p>“Facilities currently under construction should be evaluated and the above criteria applied where practicable.”</p> <p>Article 128.1.b (<b>excerpt</b>)</p> <p>“The design objective for controlling personnel exposure from external sources of radiation in areas of continuous occupational occupancy (2000 hours per year) shall [835.1002(b)] be to maintain exposure levels below an average of 0.5 mrem (5 microsieverts) per hour and as far below this average as is reasonably achievable. The design objectives for exposure rates for potential exposure to a radiological worker where occupancy differs from the above shall [835.1002(b)] be ALARA and shall [835.1002(b)] not exceed 20 percent of the applicable standards in Table 2-1.</p>	

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<b>110</b> Sec. 835.1002(c)  Regarding the control of airborne radioactive material, the design objective shall be, under normal conditions, to avoid releases to the workplace atmosphere and in any situation, to control the inhalation of such material by workers to levels that are ALARA; confinement and ventilation shall normally be used.	Article 128.1.c  “Regarding the control of airborne radioactive material, the design objective shall [835.1002(c)] be, under normal conditions, to avoid releases to the workplace atmosphere and in any situation, to control the inhalation of such material by workers to levels that are ALARA; confinement and ventilation shall [835.1002(c)] normally be used.”  Article 128.1.c ( <b>excerpt</b> )  “Regarding the control of airborne radioactive material, the design objective shall [835.1002(c)] be, under normal conditions, to avoid releases to the workplace atmosphere and in any situation, to control the inhalation of such material by workers to levels that are ALARA; confinement and ventilation shall [835.1002(c)] normally be used.”	
<b>111</b> Sec. 835.1002(d)  The design or modification of a facility and the selection of materials shall include features that facilitate operations, maintenance, decontamination, and decommissioning.	Article 128.1d ( <b>excerpt</b> )  “The design or modification of a facility and the selection of materials shall [835.1002(d)] include features that facilitate operations, maintenance, decontamination, and decommissioning.”  Article 128.2  “Facilities currently under construction should be evaluated and the above criteria applied where practicable.”	
<b>112</b> Sec. 835.1003(a) Workplace controls  During routine operations, the combination of physical design features and administrative controls shall provide that:  (a) The anticipated occupational dose to general employees shall not exceed the limits established at § 835.202; and	Article 213.1 ( <b>modified</b> )  “Occupational dose limits are provided in Table 2-1 and shall [835.202(a)] not be exceeded. All occupational exposure received during the current year shall be included when demonstrating compliance with Table 2-1 dose limits.”  Table 2-1 ( <b>excerpt</b> ) Summary of Dose Limits  “General Worker: Whole Body TEDE (internal + external):Annual Limit – 5 rem.”  Article 311 ( <b>modified and excerpted</b> )  “The primary methods used to maintain (TEDE < or = 5 rem) in a	



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	year shall be facility and equipment design features. These features may be augmented by administrative and procedural requirements.”	
<b>113</b> Sec. 835.1003(b)  (b) The ALARA process is utilized for personnel exposures to ionizing radiation	Article 311 ( <b>excerpt</b> )  “During routine operations, the combination of physical design features and administrative control shall [835.1003(a-b)] provide that: 2) the ALARA process is utilized for personnel exposures to ionizing radiation.”	
<b>Subpart L                      Radioactive Contamination Control</b>		
<b>114</b> Sec. 835.1101(a)  Control of material and equipment  (a) Except as provided in paragraphs (b) and (c) of this section, material and equipment in contamination areas, high contamination areas, and airborne radioactivity areas shall not be released to a controlled area if:  (1) Removable surface contamination levels on accessible surfaces exceed the removable surface contamination values specified in appendix D of this part; or  (2) Prior use suggests that the removable surface contamination levels on inaccessible surfaces are likely to exceed the removable surface contamination values specified in appendix D of this part.	Article 421.1 ( <b>excerpt</b> )  “Except as provided in 421.2, material and equipment in Contamination Areas, High Contamination Areas, and Airborne Radioactivity Areas shall [835.1101(a)] not be released to a controlled area if:  a.    Removable surface contamination levels on accessible surfaces exceed the removable surface contamination values specified in Table 2-2; or”  b.    Prior use suggests that the removable surface contamination levels on inaccessible surfaces are likely to exceed the removable surface contamination values specified in Table 2-2.”	
<b>115</b> Sec. 835.1101(b)  (b) Material and equipment exceeding the removable surface contamination values specified in appendix D of this part may be conditionally released for movement on-site from one radiological area for immediate placement in another radiological area only if appropriate monitoring is performed and appropriate controls for the movement are established and exercised.	Article 421.3 ( <b>excerpt</b> )  “Material and equipment exceeding the removable surface contamination values specified in Table 2-2 may be conditionally released for movement on-site from one radiological area or radioactive material area for immediate placement in another radiological area only if appropriate monitoring is performed and appropriate controls for the movement are established and exercised.”	The [B1]criteria for “appropriate monitoring and control procedures” means using CHG’s procedures to prevent the release of contained radioactive materials during routine handling. This includes monitoring frequencies as specified under those procedures.

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<b>116</b> Sec. 835.1101(c)  (c) Material and equipment with fixed contamination levels that exceed the total contamination values specified in appendix D of this part may be released for use in controlled areas outside of radiological areas only under the following conditions:  (1) Removable surface contamination levels are below the removable surface contamination values specified in appendix D of this part; and  (2) The material or equipment is routinely monitored and clearly marked or labeled, to alert personnel of the contaminated status.	Article 421.2 ( <b>excerpt</b> )  “Material and equipment with fixed contamination levels that exceed the total surface contamination values specified in Table 2-2 may be released for use in controlled areas outside of radiological areas only under the following conditions: (a) Removable surface contamination levels are below the removable surface contamination values specified in Table 2-2; and”  Article 421.2 (excerpted)  “Material and equipment with fixed contamination levels that exceed the total surface contamination values specified in Table 2-2 may be released for use in controlled areas outside of radiological areas only under the following conditions:  b. The material or equipment is routinely monitored and clearly marked or labeled to alert personnel of the contaminated status.”	
<b>117</b> Sec. 835.1102(a)  Control of areas  Appropriate controls shall be maintained and verified which prevent the inadvertent transfer of removable contamination to locations outside of radiological areas under normal operating conditions.	Article 335.4 ( <b>excerpt</b> )  “Exit points from Contamination, High Contamination or Airborne Radioactivity Areas should include the following:  a. Step-off pad located outside the exit point, contiguous with the area boundary  b. Step-off pads maintained free of radioactive contamination  d. Contamination monitoring equipment located as close to the step-off pad as background radiation levels permit.”  Article 335.7 ( <b>excerpt</b> )  “Tools or equipment being removed from areas posted for surface or airborne radioactivity control shall [835.1101(a)] be monitored for release in accordance with Article 421 or for retention in the contaminated tool crib in accordance with Article 442.5.”  Article 337.4  “The following measures should be used to prevent the spread of contamination across the boundary of Contamination Areas, High Contamination Areas and Airborne Radioactivity Areas: Use engineering controls and containment devices such as glovebags, gloveboxes and tents.”	Establishment of “appropriate controls” to prevent inadvertent transfer of removable radioactive contamination to locations outside radiological areas under normal operating conditions is subject to a graded approach that balances the relevant factors such as environmental and biological vectors. CHG will maintain a contamination control program to monitor and control radioactive contamination.  CHG implements the requirements in § 835.1102 through the CHG monitoring program and through the posting elements of the CHG posting and labeling program.

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	<p>Article 342.1</p> <p>“Contamination levels caused by ongoing work shall [835.401(a)] be monitored and maintained ALARA.”</p> <p>Article 551.8</p> <p>“Survey frequencies should be established based on potential radiological conditions, probability of change in conditions and area occupancy factors.”</p>	
<p><b>118</b>                      Sec. 835.1102(b)</p> <p>Any area in which contamination levels exceed the values specified in appendix D of this part shall be controlled in a manner commensurate with the physical and chemical characteristics of the contaminant, the radionuclides present, and the fixed and removable surface contamination levels.</p>	<p>Article 222.1 (<b>excerpt</b>)</p> <p>“Any area in which contamination levels exceed the values specified in Table 2-2 shall [835.1102(b)] be controlled in a manner commensurate with the physical and chemical characteristics of the contaminant, the radionuclides present, and the fixed and removable surface contamination levels.”</p>	<p>This requirement applies to those areas of the Hanford Site that have already been identified. In the event new areas are identified, measures shall be taken to post the area appropriately per 10 CFR 835.</p>
<p><b>119</b>                      Sec. 835.1102(c)</p> <p>Areas accessible to individuals where the measured total surface contamination levels exceed, but the removable surface contamination levels are less than, corresponding surface contamination values specified in appendix D of this part, shall be controlled as follows when located outside of radiological areas:</p> <ol style="list-style-type: none"> <li>(1) The area shall be routinely monitored to ensure the removable surface contamination level remains below the removable surface contamination values specified in appendix D of this part; and</li> <li>(2) The area shall be conspicuously marked to warn individuals of the contaminated status.</li> </ol>	<p>Article 222.3 (<b>excerpt</b>)</p> <p>“Areas accessible to individuals where the measured total surface contamination levels exceed, but the removable surface contamination levels are less than, corresponding surface contamination values specified in Table 2-2, shall [835.1102(c)] be controlled as follows when located outside Contamination Areas, High Contamination Areas, and Airborne Radioactivity Areas.”</p> <p>Article 222.3 (<b>excerpt</b>)</p> <p>“The area shall [835.1102 (c)(1)] be routinely monitored to ensure the removable surface contamination level remains below the removable surface contamination values specified in Table 2-2.”</p> <p>Article 222.3 (<b>excerpt</b>)</p> <p>“The area shall [835.1102 (c)(2)] be conspicuously marked to warn individuals of the contamination status.”</p>	

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<b>120</b> Sec. 835.1102(d)  Individuals exiting contamination, high contamination, or airborne radioactivity areas shall be monitored, as appropriate, for the presence of surface contamination.	Article 221.1 ( <b>modified and excerpted</b> )  “Individuals exiting Contamination Areas, High Contamination Areas, Airborne Radioactivity Areas shall [835.1102(d)] be monitored, as appropriate, for the presence of surface contamination as required by Article 338. This does not apply to personnel exiting areas containing only radionuclides, such as tritium, that cannot be detected using hand-held or automatic frisking equipment. At such facilities, additional emphasis should be placed on worker bioassay programs and routine contamination and air sampling programs.”  Article 221.2 ( <b>excerpt</b> )  “Monitoring for contamination shall [835.401(a)(l), & 835.1102(d)] be performed using frisking equipment that can detect total contamination of at least the values specified in Table 2-2.”	
<b>121</b> Sec. 835.1102 (e)  Protective clothing shall be required for entry to areas in which removable contamination exists at levels exceeding the removable surface contamination values specified in appendix D of this part.	Article 325.1 ( <b>excerpt</b> )  “Personnel shall [835.1102(e)] wear protective clothing during the following activities:  a. Handling of contaminated materials with removable contamination in excess of Table 2-2 levels  b. Entry to areas in which removable contamination exists at levels exceeding the removable surface contamination values specified in Table 2-2.”  Article 335.1 ( <b>excerpt</b> )  “Minimum requirements for unescorted entry into Contamination Areas shall [835.1102(e) and 835.202(b)] also include the following:  c. protective clothing, as required by the governing RWP.”  Article 335.2 ( <b>excerpt</b> )  “Minimum requirements for entry into High Contamination or Airborne Radioactivity Areas shall [HNF] include the following:  e. protective clothing, as required by the governing RWP.”	

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Requirement #	10 CFR 835 Citation	Tank Farms Radiological Control Manual, HNF-5183, Rev0	Other Implementing Provisions
Subpart M      Sealed Radioactive Source Control			
122	Sec. 835.1201  Sealed radioactive source control  Sealed radioactive sources shall be used, handled, and stored in a manner commensurate with the hazards associated with operations involving the sources.	Article 431 (excerpt)  “Sealed radioactive sources shall [835.1201] be used, handled, and stored in a manner commensurate with the hazards associated with the operations involving the sources.”	The requirements of § 835.1201 are implemented through the CHG source control program.
123	Sec. 835.1202(a)  Each accountable sealed radioactive source shall be inventoried at intervals not to exceed six months. This inventory shall:  (1) Establish the physical location of each accountable sealed radioactive source;  (2) Verify the presence and adequacy of associated postings and labels; and  (3) Establish the adequacy of storage locations, containers, and devices.	Article 431.3 (excerpt)  “Each accountable sealed radioactive source shall [835.1202(a)] be inventoried at intervals not to exceed six months. This inventory shall [835.1202(a)]:”  Article 431.3.a  “Establish the physical location of each accountable sealed radioactive source.”  Article 431.3.b  “Verify the presence and adequacy of associated postings and labels, and”  Article 431.3.c  “Establish the adequacy of storage locations, containers, and devices.”	
124	Sec. 835.1202(b)  Except for sealed radioactive sources consisting solely of gaseous radioactive material or tritium, each accountable sealed radioactive source shall be subject to a source leak test upon receipt, when damage is suspected, and at intervals not to exceed six months. Source leak tests shall be capable of detecting radioactive material leakage equal to or exceeding 0.005 microcurie.	Article 431.4 (excerpt)  “Except for sealed radioactive sources consisting solely of gaseous radioactive material or tritium, each accountable sealed radioactive source shall [835.1202(b)] be subject to a source leak test upon receipt, when damage is suspected and at intervals not to exceed six months.”  Article 431.4 (excerpt)  “Source leak tests shall [835.1202(b)] be capable of detecting radioactive material leakage equal to or exceeding 0.005 μCi.”	

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<b>125</b> Sec. 835.1202(c)  Notwithstanding the requirements of paragraph (b) of this section, an accountable sealed radioactive source is not subject to periodic source leak testing if that source has been removed from service. Such sources shall be stored in a controlled location, subject to periodic inventory as required by paragraph (a) of this section, and subject to source leak testing prior to being returned to service.	Article 431.5 ( <b>excerpt</b> )  “Notwithstanding the requirements of Article 431.4, an accountable sealed radioactive source is not subject to periodic source leak testing if that source has been removed from service.”  Article 431.5 ( <b>excerpt</b> )  “Such sources shall [835.1202(c)] be stored in a controlled location and subject to periodic inventory in accordance with Article 431.3 and subject to leak testing prior to being returned to service.”	
<b>126</b> Sec. 835.1202(d)  Notwithstanding the requirements of paragraphs (a) and (b) of this section, an accountable sealed radioactive source is not subject to periodic inventory and source leak testing if that source is located in an area that is unsafe for human entry or otherwise inaccessible.	Article 431.6  “Notwithstanding the requirements of Articles 431.3 and 431.4, an accountable sealed radioactive source is not subject to periodic inventory and source leak testing if that source is located in an area that is unsafe for human entry or otherwise inaccessible.”	
<b>127</b> Sec. 835.1202(e)  An accountable sealed radioactive source found to be leaking radioactive material shall be controlled in a manner that minimizes the spread of radioactive contamination.	Article 431.7 ( <b>excerpt</b> )  “ An accountable sealed radioactive source found to be leaking radioactive material shall [835.1202(e)] be controlled in a manner that minimizes the spread of radioactive contamination. These controls should include wrapping or containing the source, applying appropriate labels, and removing the source from service. A minimum detection threshold of equal to or less than 0.005 µCi will be used.”	

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<b>Subpart N        Emergency Exposure Situations</b>			
<b>128</b>	Sec. 835.1301(a)	Article 213.4 ( <b>excerpt</b> )  “A general employee whose occupational dose has exceeded the numerical value of any of the limits in specified in Table 2-1 as a result of an authorized emergency exposure may be permitted to return to work in radiological areas during the current year providing that all of the following conditions are met:  • Approval is first obtained from the contractor management and the Head of the responsible DOE field organization (DOE-ORP Manager);”  Article 213.4 ( <b>excerpt</b> )  “A general employee whose occupational dose has exceeded the numerical value of any of the limits in specified in Table 2-1 as a result of an authorized emergency exposure may be permitted to return to work in radiological areas during the current year providing that all of the following conditions are met:  • The individual receives counseling from radiological protection and medical personnel regarding the consequences of receiving additional occupational exposure during the year; and”  Article 213.4 ( <b>excerpt</b> )  “A general employee whose occupational dose has exceeded the numerical value of any of the limits in specified in Table 2-1 as a result of an authorized emergency exposure may be permitted to return to work in radiological areas during the current year providing that all of the following conditions are met:  • The affected employee agrees to return to radiological work.”	In the event the circumstances outlined in § 835.1301(a) occurs, the provisions in § 835.1301 shall be followed.  CHG implements requirement § 835.1301(a) through the emergency preparedness program, and administrative documents.
<b>129</b>	Sec. 835.1301(b)	Article 722.12  “Authorized emergency exposures and planned special exposures shall [835.1301(b)] be accounted for separately, but maintained with the individual’s occupational exposure records.”  Article 723.1 ( <b>excerpt</b> )  “The complete records of radiological incidents and occurrences involving personnel dose shall [835.1301(b)] be retained.”	

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	Article 213.b ( <b>excerpt</b> )  “All doses exceeding the limits specified in Table 2-1 shall [835.1301(b)] be recorded in the affected individual’s occupational dose record.”	
<b>130</b> Sec. 835.1301(c)  When the conditions under which a dose was received in excess of the limits specified in Sec. 835.202, except those received in accordance with Sec. 835.204, have been eliminated, operating management shall notify the Head of the responsible DOE field organization.	Article 213.4 ( <b>excerpt</b> )  “When the conditions under which a dose was received in excess of the limits specified in Table 2-1, except those received in accordance with the planned special exposure provisions in Article 213.3, have been eliminated, operating management shall [835.1301(c)] notify the Head of the responsible DOE field organization.”	
<b>131</b> Sec. 835.1301(d)  Operations after a dose was received in excess of the limits specified in Sec. 835.202, except those received in accordance with Sec. 835.204 may be resumed only with the approval of DOE.	Article 345.4 ( <b>excerpt</b> )  “Operations after a dose was received in excess of the limits specified in Table 2-1, except those received in accordance with Article 213.4, may be resumed only with the approval of DOE.”	
<b>132</b> Sec. 835.1302(a) Emergency exposure situations.  The risk of injury to those individuals involved in rescue and recovery operations shall be minimized.	Appendix 2A ( <b>excerpt</b> )  “Guidelines for Control of Emergency Exposures”  “In extremely rare cases, emergency exposure to radiation may be necessary to rescue personnel or to protect major property. Emergency exposures may be authorized in accordance with the provisions contained in Article 213.4.”  Article 213.4.e ( <b>excerpt</b> )  “The risk of injury to those individuals involved in rescue and recovery operations shall [835.1302(a)] be minimized.”	“Risk...shall be minimized” means, if alternative actions are available to meet emergency needs, then adopting the action with the lowest assessed risk of significant personnel injury shall take precedence over property loss considerations.  Clarification: Implementation of guidelines will utilize professional judgement within the confines of approved emergency procedures. Subsequent to an emergency, CHG use of professional judgement will be evaluated as a part of the event as discussed in “Occupational Radiation Protection Record -Keeping and Reporting Guide,” DOE G 441.1-11 of May 1999, Section 4.1.2.1, 8th bullet.



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<b>133</b> Sec. 835.1302(b)  Operating management shall weigh actual and potential risks against the benefits to be gained.	Article 213.4.e ( <b>excerpt</b> )  “Emergency exposure limits are not Planned Special Exposure limits. The following apply to emergency situations:  Operating management shall [835.1302(b)] weigh actual and potential risks against the benefits to be gained.”	
<b>134</b> Sec. 835.1302(c)  No individual shall be required to perform a rescue action that might involve substantial personal risk.	Article 213.4.e ( <b>excerpt</b> )  “Emergency exposure limits are not Planned Special Exposure limits. The following apply to emergency situations:  No individual shall [835.1302(c)] be required to perform a rescue action that might involve substantial personal risk.”	
<b>135</b> Sec. 835.1302(d)  Each individual authorized to perform emergency actions likely to result in occupational doses exceeding the values of the limits provided at § 835.202(a) shall be trained in accordance with § 835.901(b) and briefed beforehand on the known or anticipated hazards to which the individual will be subjected.	Appendix 2A ( <b>excerpt</b> )  “Emergency exposures may be authorized in accordance with the provisions contained in Article 213.4.”  Article 656.7  “Provisions should be in place to accommodate rapid site and radiological area access by on-site and off-site emergency workers such as firefighters, medical personnel, and security personnel.  7. Each individual authorized to perform emergency actions likely to result in occupational doses exceeding the values of the limits provided in Table 2-1 shall [835.1302(d)] be trained in accordance with Article 613 and briefed beforehand on the known or anticipated hazards to which the individual will be subjected.”	

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<b>136</b> Sec. 835.1304(a) Nuclear accident dosimetry.  Installations possessing sufficient quantities of fissile material to potentially constitute a critical mass, such that the excessive exposure of individuals to radiation from a nuclear accident is possible, shall provide nuclear accident dosimetry for those individuals.	<b>Article 515.1 (excerpt)</b>  “Installations possessing sufficient quantities of fissile material to potentially constitute a critical mass, such that the excessive exposure of individuals to radiation from a nuclear accident is possible, shall [835.1304(a)] provide nuclear accident dosimetry for those individuals.”	For the purpose of this requirement, CHG defines “Critical Mass” as the smallest mass of fissionable material that will support a self-sustaining chain reaction under specified conditions.  For the purpose of this requirement, CHG defines “Safe Mass” as that mass of fissionable materials which is subcritical for all conditions to which it could reasonably be expected to be exposed, including processing, handling, storing, and procedural uncertainties.  CHG does not currently manage any facilities identified within the scope of § 835.1304. Should facilities be identified within this scope the requirements of § 835.1304 will be followed.
<b>137</b> Sec. 835.1304(b)  Nuclear accident dosimetry shall include the following:  (1) A method to conduct initial screening of individuals involved in a nuclear accident to determine whether significant exposures to radiation occurred; (2) Methods and equipment for analysis of biological materials; (3) A system of fixed nuclear accident dosimeter units; and (4) Personal nuclear accident dosimeters.	<b>Article 515.2 (excerpt)</b>  “Nuclear accident dosimetry shall [835.1304(b)] include the following: a. A method to conduct initial screening of individuals involved in a nuclear accident to determine whether significant exposures to radiation occurred;” b. Methods and equipment for analysis of biological materials;” c. A system of fixed nuclear accident dosimeter units; and” d. Personal nuclear accident dosimeters.”	CHG does not currently manage any facilities identified within the scope of § 835.1304. Should facilities be identified within this scope, the requirements of § 835.1304 will be followed.

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[B1](Steve Ellis) Author: Do administrative procedures do this or do work specific procedures do this?